ON THE HETEROGENEITY OF JUVENILES WHO HAVE SEXUALLY OFFENDED:

THE ROLE OF ADVERSE CHILDHOOD EXPERIENCES IN THE OCCURRENCE, MAINTENANCE, AND PREDICTION OF CRIME

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ABSTRACT

The role of adverse childhood experiences (ACEs) in juvenile sexual offending is unclear. The present thesis broadens the current knowledge about the influence of ACEs on the occurrence, maintenance, and prediction of crime in juveniles who have sexually offended (JSOs). Four studies were conducted based on a comprehensive case file analysis of a large JSO sample from Switzerland. Taking into account the heterogeneity of JSOs with regard to ACEs and offense characteristics, person-centered approaches (Latent Class/Transition Analyses) were used along with variable-centered methods to identify JSO-subtypes based on individual ACE histories and offense patterns. Results indicated that ACEs were differentially associated with offense patterns and that severe and enduring forms of ACEs played a major role in criminal persistence. Furthermore, increased ACE burden and greater offense severity were related to criminal recidivism but also limited the accuracy of existing instruments designed to predict criminal recidivism of JSOs. Findings emphasize the need to consider the heterogeneity of JSOs regarding ACEs and criminal patterns in research, clinical, judicial, but also policy-related settings in order to implement effective prevention and intervention approaches aimed at the reduction of juvenile (sexual) crime, and thus at contributing to the safety of our society and to providential developments of juveniles toward a healthy and non-delinquent future.

ZUSAMMENFASSUNG

Die Rolle von belastenden Kindheitserfahrungen (BK) bezüglich jugendlicher Sexualdelinquenz ist unklar. Die vorliegende Thesis erweitert den Wissenstand zum Einfluss von BK auf die Begehung, Aufrechterhaltung und Vorhersage von Delinquenz bei Jugendlichen, die Sexualdelikte begangen haben (JS). Basierend auf der Aktenanalyse einer umfangreichen Stichprobe von JS aus der Schweiz wurden vier Studien durchgeführt. Aufgrund der Heterogenität von JS bezüglich BK und Deliktmerkmalen wurden neben variablenzentrierten Ansätzen personenzentrierte Verfahren (Latente Klassen-/Transitionsanalysen) verwendet, um spezifische JS-Subtypen gemäss BK und Deliktmerkmalen zu definieren. Die Ergebnisse zeigen, dass BK differenzierte Zusammenhänge mit Deliktmerkmalen aufweisen, schwere und andauernde BK eine wichtige Rolle bezüglich zukünftiger Delinquenz einnehmen und eine erhöhte Anzahl von BK sowie die Deliktschwere zwar mit zukünftiger Delinquenz zusammenhängen, gleichzeitig aber die Genauigkeit bestehender Instrumente zur Vorhersage zukünftiger Delinquenz bei JS einschränken. Die Befunde betonen die Notwendigkeit, die Heterogenität von JS bezüglich BK und Deliktmerkmalen in der Forschung sowie in klinischen, juristischen und politischen Kontexten genau zu betrachten, um effektive Massnahmen zur Reduktion jugendlicher (Sexual-) Delinquenz zu implementieren und somit zur Sicherheit unserer Gesellschaft sowie zu einer gesunden und deliktfreien jugendlichen Entwicklung beizutragen.

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LIST OF ABBREVIATIONS

aBIC	sample-size adjusted Bayesian Information Criterion
ACE	Adverse Childhood Experience
ADHD	Attention Deficit Hyperactivity Disorder
AIC	Akaike Information Criterion
ANOVA	Analysis of Variance
AR	Adjusted Residual
AUC	Area Under the Curve
BIC	Bayesian Information Criterion
BK	Belastende Kindheitserfahrungen
BLRT	Bootstrapped Parametric Likelihood Ratio Test
CI	Confidence Interval
CPT	Cognitive Processing Therapy
CSAQ	Child Sexual Abuse Questionnaire
CTQ	Child Trauma Questionnaire
d	Cohen's *d;* Index of Effect Size
df	Degrees of Freedom
DSM	Diagnostic and Statistical Manual of Mental Disorders
EKNZ	Ethics Committee of Northwest/Central Switzerland
EN	Emotional Neglect
ERASOR	Estimate of Risk of Adolescent Sexual Offense Recidivism
F	Fisher's F-Ratio; Test Statistic of ANOVA
FORNET	Narrative Exposure Therapy for Forensic Offender Rehabilitation
GST	General Strain Theory
HR	Hazard Ratio
ICC	Intraclass Correlation Coefficient; Index of Interrater Agreement
ICD	International Classification of Diseases
ISCO	International Standard Classification of Occupations
JS	Jugendliche, die Sexualdelikte Begangen Haben
JSO	Juvenile Who has Committed Sexual Offenses / Juvenile Who (has) Sexually Offended / Juvenile Convicted of Sexual Offenses / Juveniles Who has Shown Sexually Offending Behavior
JSO-	JSO With no Other, Nonsexual Crime

JSO+	JSO With Other, Nonsexual Crime
JSO-A	JSO With Adolescent or Adult Victim
J-SOAP	Juvenile Sex Offender Assessment Protocol
JSO-C	JSO With Child Victim
JVQ	Juvenile Victimization Questionnaire
k	Number of Classes in Latent Class/Transition Analysis
KIDNET	Narrative Exposure Therapy for Children and Adolescents
LCA	Latent Class Analysis
LL	Lower Limit of Confidence Interval
LMR LRT	Lo-Mendell-Rubin Likelihood Ratio Test
LTA	Latent Transition Analysis
LTV	Long-Term Vulnerability
M	Mean
MACE	Maltreatment and Abuse Chronology of Exposure Scale
MAOA	Monoamine Oxidase A
Mdn	Median
MST	Multisystemic Therapy
N	Sample size (total)
n	Sample size (subsample)
OR	Odds Ratio
p	Level of Significance
PEERE	Peer Emotional Abuse
PEERP	Peer Physical Bullying
PN	Physical Neglect
PNVEA	Parental Nonverbal Emotional Abuse
PPA	Parental Physical Abuse
PTSD	Post Traumatic Stress Disorder
PVA	Parental Verbal Abuse
r	Correlation Coefficient
RNR	Risk Need Responsivity
ROC	Receiver Operator Characteristic
SCT	Social Control Theory
SD	Standard Deviation
SES	Socioeconomic Status

SEX	Sexual Victimization
SIP	Social Information-Processing Model
SLT	Social Learning Theory
SLTC	Social Learning Theory for Criminal Behaviors
SORAG	Sex Offender Risk Appraisal Guide
SORNA	Sex Offender Registration and Notification Act
SPJ	Structured Professional Judgment
SPSS	IBM SPSS Statistics
t	Test Statistic of t-Tests
TARGET	Trauma Adaptive Recovery Group Education and Therapy
	Trauma Affective Regulation Guide for Education and Therapy
TGCTA	Trauma and Grief Components Therapy for Adolescents
ThePaS	Therapieprogramm für ein Angemessenes Sexualverhalten
TIC	Trauma Informed Care
TOPA	Trauma Outcome Process Assessment
U	Test Statistic of Mann-Whitney U-Tests
UCJ	Unstructured Clinical Judgment
UL	Upper Limit of Confidence Interval
VIF	Variance Inflation Factor
VLM LRT	Vuong-Lo-Mendell-Rubin Likelihood Ratio Test
VRAG	Violence Risk Appraisal Guide
VRAG-R	Violence Risk Appraisal Guide-Revised
WITP	Witnessing Violence Between Parents
WITS	Witnessing Violence Toward Siblings
z	Standardized Test Statistic
α	Cronbach's α; Index of Internal Consistency
κ	Cohen's κ; Index of Interrater Agreement
χ^2	Test statistic of Chi-Squard Tests

A. GENERAL INTRODUCTION

The present thesis contributes to the empirical knowledge of adverse childhood experiences (ACEs) as influencing factors for the occurrence, maintenance, and prediction of crime in sexually abusive adolescents.

The first part of the introductory chapter A will accentuate the relevance of broaching the issue of juvenile sexual offending. First, insight will be given into research on the normative developmental course of adolescent sexuality, before turning to sexually abusive behaviors both experienced and committed by minors (before age 18) and young adults (up to age 25). Subsequently, the consequences of sexually abusive experiences are emphasized for victims, perpetrators, and society at large.

The second part of chapter A will summarize the current scientific knowledge in the field of ACEs. The term *ACEs* will be defined and the wide range of psychological, physical, and social impairments associated with the occurrence of ACEs will be highlighted.

The third part of the introduction will focus on the prevalence of ACEs in delinquent juveniles and, in particular, juveniles who have committed sexual offenses (JSOs). Theoretical approaches will be presented that aim to explain the relationship between ACEs and general (nonsexual) crime as well as between ACEs and sexual delinquency. The JSOs' typical courses of criminal offending will be summarized and the impact of ACEs on criminal persistence as well as their contributions to the assessment of recidivism risk will be addressed.

Lastly, limitations of current research on the role of ACEs in adolescent sexual offending will be highlighted. Thereby, the variety of JSOs with regard to ACEs and offense characteristics will receive particular consideration because this heterogeneity is a major factor that impedes the derivation of universal implications for the assessment and treatment of JSOs.

Chapter B represents the empirical part of the present thesis. The current goals and research questions will be presented, which focused on disentangling the heterogeneity of JSOs related to ACEs and offense characteristics in order to strive for more sophisticated conclusions about the occurrence, maintenance, and prediction of crime in JSOs. A general overview over the study procedures will be given that led to the conductance of four empirical studies, which (a) examined the associations of distinct JSO-subtypes based on their patterns of ACEs with offense and victim characteristics of the initial sexual offense; (b) investigated the occurrence of distinct JSO-subtypes based on their patterns of ACEs across particular developmental periods and their associations with sexual and nonsexual reoffending; (c) de-

rived distinct JSO-subtypes based on their offense patterns, explored their differences according to psychosocial adversity and ACEs, and related those subtypes to sexual and nonsexual reoffending; and (d) compared the accuracies of three risk assessment instruments for the prediction of sexual, nonsexual-violent, and general reoffending of JSOs while accounting for the effects of offense severity and cumulative ACEs.

A general discussion (Chapter C) will summarize the empirical findings evolved from the present thesis. Their relevance for future research in the field of adolescent sexual delinquency will be emphasized as well as their potential to inform judicial, clinical, and policy procedures that aim at reducing the occurrence of juvenile sexual offending, and thus at ensuring the safety of our society and at promoting healthy and carefree developmental pathways into a functional and non-delinquent adulthood for both victims and perpetrators of sexually abusive behaviors.

1. Sexuality in Adolescence and Young Adulthood

1.1 The onset and prevalence of sexual behaviors

Adolescence represents a crucial life period for the formation of sexuality: Along with anatomical, hormonal, and physiological changes that accompany the course of puberty, adolescence sets the stage for the development, awareness, and interpretation of sexual desire and sexual arousal, which eventually leads to the engagement of juveniles and young adults in masturbation and interpersonal sexual behaviors (Fortenberry, 2013). In the framework of a recent survey from Switzerland that included self-reports from 29,350 adult participants (age range = 18-54 years), Hermann, Bosshardt, Milic, and Nowak (2016) found the average age of first sexual intercourse to be 17 years for females and 18 years for males. Yet, 62% of the female and 48% of the male participants reported to have had their first sexual intercourse before the age of 18 years, with 23% of females and 19% of males dating the onset of sexual intercourse before the age of 16 years. Almost all participants had their first sexual intercourse before the age of 25 years.

A representative study from Germany (Bode & Heßling, 2015) surveyed a sample of more than 6000 14- to 25-year-olds and found rates as high as 62% for female and 66% for male participants who reported to have had sexual intercourse before the age of 18 years. By the age of 25 years, 88% of the female and 94% of the male participants reported to have had sexual intercourse at least once. The study further found that about 95% of the sample had experienced any form of interpersonal (hetero-) sexual behaviors by the age of 18. Kissing was identified as the earliest form (about three fourths of the 14- to 17-year-olds and more than 95% of the 18- to 25-year-olds reported kissing experiences), followed by petting expe-

riences (40-50% of the 14- to 17-year-old and 70-90% of the 18- to 25-year-old participants; depending on the type of petting, e.g., touching breasts or genitals). About one tenth of the sample reported to have engaged in any intimate physical contact with people of the same sex during the previous year. Of those, 7-12% of the females and 4-6% of the males were below the age of 18 years. The involvement in masturbation behaviors became more frequently with increasing age (up to the age of 14 years: 19% females, 54% males; up to the age of 16 years: 38% females, 81% males; and up to the age of 18 years: 44% females, 85% males), yet representing stable prevalence rates since the 1980s (Bode & Heßling, 2015). In total, 34% of the females and 28% of the males between 14 and 17 years of age considered themselves to be currently sexually active.

A representative study from the U.S. included self-reported data from more than 15,000 9th- to 12th-grade students (Kann et al., 2016). A total of 41% of the sample (39% females and 43% males) reported to have had sexual intercourse at least once. More specifically, the experience of sexual intercourse was reported by 24% of the 9th-graders, 35% of the 10th-graders, 50% of the 11th-graders, and 58% of the 12th-graders. A trend toward decreasing prevalence rates was found (rates of reported sexual intercourse: 54% in 1991 and 47% in 2013). Moreover, the prevalence of having had sexual intercourse before the age of 13 years had decreased, with rates of 10% in 1991, 6% in 2013, and 4% in 2015. The rates of current sexual activity (defined as having had sexual intercourse with at least one person within three months before assessment) also appeared to be decreasing, with 38% in 1991, 34% in 2013, and 30% in 2015. More specifically, current sexual activity was reported by 16% of the 9th-graders, 26% of the 10th-graders, 36% of the 11th-graders, and 46% of the 12th-graders.

Yet, despite the findings of decreasing physical forms of sexuality, other studies point to the increase of (potentially abusive) sexual behaviors among adolescents via the Internet, including the creation, consumption, and exchange of sexually explicit pictures and/or videos as well as sexually motivated online conversation (e.g., Ashurst & McAlinden, 2015; Mohler-Kuo et al., 2014; Wolak & Finkelhor, 2011).

Although prevalence rates across these studies may lack comparability due to differences in sample compositions and study procedures, findings yet allow the conclusion that sexuality is a topic of major relevance in adolescence and young adulthood.

1.2 The prevalence of sexually abusive behaviors in community samples

Despite the normative course of sexual development, adolescent sexuality becomes worrisome when young people experience and/or include any forms of coercion within their sexual behaviors. According to Bessler (2017), adolescence is a major risk period for the en-

gagement in sexually abusive behaviors because most juveniles lack stabilized sexual self-concepts. The aim to integrate and manage upcoming sexual needs within the given legal circumstances may be challenged, e.g., by insecure self-awareness and deficient sexual and social competence (Bessler, 2017). A number of recent studies have emphasized the common occurrence of sexual victimization and perpetration among minors around the world.

For instance, Barth, Bermetz, Heim, Trelle, and Tonia (2013) conducted a meta-analysis summarizing 55 studies from 24 countries, each of which included data from at least 1,000 participants below the age of 18 years. They found a considerable number of juveniles reporting life-time experiences of sexual victimization, including non-contact abuse (31% females, 17% males), contact abuse (13% females, 6% males), and forced intercourse (9% females, 3% males). In another meta-analysis, Stoltenborgh, Bakermans-Kranenburg, Alink, and van IJzendoorn (2015) categorized data from 244 studies conducted between 1980 and 2008 based on the occurrence of sexual victimization before the age of 18 years across continents. They reported rates for female and male victims of sexual coercion, respectively, of 20% and 8% in North America, 14% and 6% in Europe, 22% and 8% in Australia, 20% and 19% in Africa, and 11% and 4% in Asia.

In the abovementioned representative study from Germany (Bode & Heßling, 2015), 21% of the females and 5% of the males indicated to have been forced into sexual activities against their will by male perpetrators, most of them (previous) intimate partners, but also relatively new acquaintances or peers. Furthermore, Mohler-Kuo et al. (2014) surveyed a representative sample of more than 6,700 9^{th}-grade students (M_{age} = 15.5 years) in Switzerland. Among those adolescents, 40% of the females and 17% of the males reported life-time sexual victimization (including online forms of sexual harassment). More particular, of females and males, respectively, 35% and 15% reported non-contact sexual victimization, 15% and 5% reported contact sexual victimization without penetration, and 3% and 1% reported contact sexual victimization including penetration. In line with recent notions about the growing prevalence of (abusive) sexual behaviors conducted via electronic devices or the Internet (e.g., Ashurst & McAlinden, 2015; Wolak & Finkelhor, 2011), Mohler-Kuo et al. (2014) identified Internet-based sexual abuse as the most frequent type of sexual victimization experienced in their sample. Moreover, a considerable number of perpetrators were identified as having been under the age of 18 years and having been known to the victims as either acquaintances or intimate partners. Based on the same wave of data collection, Aebi, Landolt, et al. (2015) found a total of 4% (1% females, 7% males) to report ever having coerced someone into sexual activities from undressing to physical contact.

Using data from representative samples of 17- to 20-year-old male high-school students from Sweden and Norway, Seto et al. (2010) found 18% to 22% of adolescents reporting life-time sexual victimization, and 11% to 12% reporting to ever have themselves forced someone else into sexual activities. With reference to data from the U.S., an average of about 7% (10% females, 3% males) of the participants in Kann and colleagues' (2016) national survey (see above) reported having ever been physically forced into nonconsensual sexual intercourse. Of those being in an intimate relationship within one year before assessment, 11% (16% females, 5% males) stated coercive sexual behaviors (including kissing, touching, and sexual intercourse) conducted by their intimate partners. Finkelhor, Shattuck, Turner, and Hamby (2014) examined a somewhat smaller sample and found that by the age of 17 years, 27% of females and 5% of males had indicated some form of life-time contact sexual victimization, with 18% of females and 3% of males identifying the perpetrator to have been 17 years old at most.

Williams et al. (2014) surveyed a total of more than 18,000 9^{th}- to 12^{th}-graders, indicating rates of 19% (23% females, 14% males) of students having been forced into nonconsensual sexual activities, and 8% (6% females, 11% males) to have forced someone else into nonconsensual sexual activities within the previous year.

1.3 The prevalence of officially registered juvenile sexual offending

Despite the alarming prevalence of sexual coercion among adolescents, only a fraction of all perpetrators is brought to justice for their abusive behaviors. Many victims refuse to disclose sexually abusive experiences, and only few incidents come to the attention of criminal justice institutions but remain in the dark field of crime (e.g., Maier, Mohler-Kuo, Landolt, Schnyder, & Jud, 2013). Bode and Heßling (2015) stated that about one fourth of the females in their study who were victims of sexual coercion did not tell anybody about their experiences; if they did, they most likely disclosed to peers or parents, whereas professional agencies (e.g., psychologists) were rarely contacted. Equally, Mohler-Kuo et al. (2014) found that only about half of the female victims and the minority of male victims talked to someone (most likely peers and family) about their sexually abusive experiences. The police were involved in less than one out of 10 cases.

Definition of juvenile sexual offending

The present thesis only includes adolescents who have been involved in the criminal justice system for the commitment of sexually offending behaviors. In the following, these adolescents will be referred to as juveniles who have committed sexual offenses, juveniles who (have) sexually offended, juveniles convicted of sexual offenses, or juveniles who have

shown sexually offending behavior (JSOs). In accordance to definitions identified in previous research, JSOs are considered to be "youth, from puberty to the legal age of majority, committing any sexual interaction with a person of any age, against the victim's will, without consent, or in an aggressive, exploitative or threatening manner." (G. Ryan, 1986; p. 131).

Irrespective of specific national jurisdictions, the definition of sexually offending behavior may include – but is not limited to – sexual behaviors with and without physical contact, such as verbal sexual harassment, exhibitionism, voyeurism, nonconsensual kissing and/or touching, digital, vaginal, and anal penetration, but also sexual harassment via the Internet or other electronic devices (e.g., Mohler-Kuo et al., 2014). Special cases are sexual activities that involve a person who is under the legal age of consent or who is in a state of dependence toward the perpetrator. Although they may not necessarily involve any act of threat or aggression, such sexual activities may indeed be considered as sexual offenses depending on the given state or national law, e.g., when the age discrepancy exceeds the limitations defined by the particular penal code (e.g., Maier et al., 2013). Due to varying national laws, caution is required in comparing results of JSO studies from different countries.

Registered cases of juvenile sexual offending

According to the Swiss Federal Statistical Office (2017a, 2017b), juveniles younger than 18 years represented about 14% of all officially registered defendants of sexual offending in Switzerland in 2016. Based on the total number of registered youth delinquency in 2016, sexual offenses accounted for a fraction of about 7%. Indeed, juveniles were more frequently accused of other crime, such as shoplifting, property damage, or bodily injury. Whereas juvenile crime rates have decreased over the last years (i.e., since 2013), both the fraction of juveniles accused of sexual offenses in relation to adult defendants of sexual offenses and the fraction of juveniles accused of sexual offenses in relation to juvenile defendants of other crime types have been relatively stable. Similar numbers have been reported in different countries. In Germany, for instance, 15% of all subjects accused of sexual offenses were below the age of 18 years in 2016 (German Federal Criminal Police Office, 2017; German Federal Ministry of the Interior, 2017). In the U.S., juveniles were involved in about 17% of all arrests for rape and other sexual offenses (excluding prostitution) in 2015[1](Federal Bureau of Investigation, 2016). In his recent review, Lussier (2017) underscores the astonishing regularity of juvenile sexual offending across nations and time.

[1] Final statistics for 2016 were not yet available at the time this thesis was completed.

1.4 The consequences of sexually abusive behaviors

The occurrence of (juvenile) sexual offending elicits particular concern when considering its wide range of negative psychological, physical, and social outcomes. Sexual crime has been labeled an issue of public health and calls have been made to encounter youth violence and child sexual abuse by public health approaches (e.g., Anderson, Mangels, & Langsam, 2004; Harper, Hogue, & Bartels, 2017; Irwin & Rickert, 2005; Landolt, Schnyder, Maier, & Mohler-Kuo, 2016; Letourneau, Eaton, Bass, Berlin, & Moore, 2014; McMahon & Puettl, 1999; Sood & Berkowitz, 2016).

The consequences of sexually abusive behaviors for victims

Maniglio (2009) considered sexual victimization in childhood and adolescence "as a general, nonspecific risk factor for psychopathology" (p. 647). Indeed, an extensive body of research including meta-analyses, longitudinal examinations, and twin studies has pointed to the associations of sexual victimization with multiple maladaptive health and social outcomes over the life-span, such as – but not limited to – depression and anxiety, suicidal tendency, eating and sleeping disorders, somatoform disorders, post-traumatic stress disorder (PTSD), conduct disorder, personality disorders, alcohol/illegal drug dependence, early onset of sexual activity and engagement in sexual risk behaviors (e.g., unprotected sex, promiscuity, and early/unwanted pregnancy), increased risk of physical health issues, increased dependence on the welfare system, decreased self-esteem and life-satisfaction, and re-victimization (e.g., Chen et al., 2010; Devries et al., 2014; Fergusson, McLeod, & Horwood, 2013; Homma, Wang, Saewyc, & Kishor, 2012; Irwin & Rickert, 2005; Landolt et al., 2016; Lindert et al., 2014; Madigan, Wade, Tarabulsy, Jenkins, & Shouldice, 2014; Nelson, Heath, Madden, & et al., 2002; Paras, Murad, Chen, & et al., 2009; S. Turner, Taillieu, Cheung, & Afifi, 2017; Walker, Freud, Ellis, Fraine, & Wilson, 2017).

The consequences of sexually abusive behaviors for perpetrators

Irrespective of the far-reaching impairments associated with sexual victimization, perpetrators of sexual offenses will also face a multitude of negative consequences in the aftermath of their behavior. Most strikingly, JSOs have to face a multitude of prejudice and stereotypical attitudes brought toward them by the general public. Chaffin (2008) stressed that common misperceptions about JSOs are related to untrue speculations that these juveniles represent (a) a very homogeneous sample; (b) specifically peculiar adolescents regarding sexual behaviors; (c) continuously dangerous offenders with high risks of reoffending; and (d) a group of juveniles with persistent peculiarities resistant to change. Such stereotypes about JSOs may affect policy making and give rise to prevention and intervention practices

(e.g., public registration/notification or institutionalization) which rather contribute to impaired self-awareness of JSOs, impede their social reintegration, and thus enhance the risk of reoffending instead of ensuring the public safety (Chaffin, 2008; Harper et al., 2017).

Several experts have criticized current policy procedures for JSOs (for an overview of the development of and criticism against pertinent policies in the U.S., see e.g., A. J. Harris & Socia, 2016; Laws, 2016; Lehrer, Letourneau, Pittman, Rumenap, & Leversee, 2016; Zgoba & Ragbir, 2016). In the U.S., considerable concern has been expressed toward the Adam Walsh Child Protection and Safety Act, passed in 2006, especially regarding the therein integrated Sex Offender Registration and Notification Act (SORNA). According to these policies, individuals who have sexually offended are categorized into groups of dangerousness based on the severity of their offending. In addition, these individuals are registered for different amounts of time depending on the estimation of their dangerousness, and information about them (with varying extent among states) may be made publicly accessible, e.g., via the Internet (for details see, e.g., Zgoba & Ragbir, 2016). However, the risk categories of SORNA have been considered as unsuitable to predict reoffending and the application of such policies has not been found to decrease recidivism (Caldwell, Ziemke, & Vitacco, 2008; Zgoba & Ragbir, 2016). Public access to personal information about JSOs may further intensify their stigmatization and prevent these youth from forming supportive social relationships which may protect them from persistent crime involvement (Chaffin, 2008).

Zgoba and Ragbir (2016) also commented on international policies regarding sexual offending. They concluded that in contrast to the U.S., Canada and European countries rather focus on the protection of the privacy and reintegration of individuals who have sexually offended: Although various countries (including the UK, Germany, and France) have some kind of register, private information is not generally made publicly accessible.

Recently, certain policy changes concerning sexual offending have been discussed in Switzerland. The debate is described in detail in a report of the Swiss Federal Office of Justice (2015) and updates are published on the Swiss Federal Office of Justice website (https://www.bj.admin.ch/bj/de/home/sicherheit/gesetzgebung/berufsverbot.html). In short, 63.5% of the voters in a national referendum conducted in May 2014 affirmed a revision of a statute which dictates an unconditional lifelong ban from working (either professionally or voluntarily) with children, adolescents, or other dependent individuals for those who have committed any sexual offenses against minors or other dependent persons. Although a respective amendment has been included in the Swiss constitution by January 2015, the actual legal implementation is still under debate. For instance, the mandatory order of the ban - irre-

spective of the severity and the specific circumstances of the given offense - has been criticized for conflicting with the constitutional principle of proportionality and with the international law of the European Convention on Human Rights. Thus, it has been stressed that although the unconditional lifelong ban would be ordered by default, courts should still be able to make exceptions under consideration of individual circumstances (which would be in accordance with other international proceedings, e.g., in Germany, Austria, the UK, or Canada). It has also been proposed to explicitly exclude juvenile offenders from this ban given the aim of the criminal law regarding young offenders to promote their social reintegration and functional personality development by ordering temporary and flexible penalties or measures. In order to implement the ban, long-term (potentially lifetime) registration of respective offenders would be necessary, which, however, would not be made publicly accessible. Instead, an offender would need to privately request a particular criminal record in case he or she applied for a profession or for voluntary work with children, adolescents, or other dependent individuals. However, the respective employers themselves would be responsible for demanding this criminal record.

The consequences of sexually abusive behaviors for society

The consequences of sexually abusive behaviors for society are not least expressed by the costs for the treatment and aftercare of victims and for the judicial and clinical procedures for perpetrators. Thielen et al. (2016) have recently estimated the societal costs for sexual victimization experienced in childhood and adolescence in the Netherlands. Including costs for sexual abuse victims regarding direct medical expenses (e.g., therapeutic treatment), direct non-medical expenses (e.g., transport to therapeutic sessions), and indirect non-medical expenses (e.g., impaired working ability), they found that among various types of ACEs (e.g., emotional and physical abuse) the costs for victims of sexual abuse were highest with more than 1,500 € (approximately 1,655 CHF[2]) annual personal excess expenses. A study from the UK has estimated the 2012/2013 follow-up costs for childhood and adolescent sexual victimization to have been about 182 million pounds (approximately 224 million CHF[2]) for the health care system, 149 million pounds (approximately 184 million CHF[2]) for the criminal justice system, and 2.7 billion pounds (approximately 3.3 billion CHF[2]) for the labor market (Saied-Tessier, 2014). Referring to the U.S., Borduin and Dopp (2015) stated that the average estimated costs of one JSO-arrest in 2013 had been as high as 85,170 $ (approximately 80,545 CHF[2]).

[2] according to current exchange rates on the 25th of July 2017, provided by https://www.six-swiss-exchange.com/services/currency_converter_en.html

Taken together, the prevalence of sexually abusive behaviors among minors, the detrimental consequences for the victims, the apparently inadequate policies for perpetrators, and the associated economic/societal costs underscore the importance to broaden the scientific knowledge about juvenile sexual delinquency. In order to tailor appropriate prevention and intervention approaches, and thus protect the society from further victimization while allowing perpetrators to engage in a functional development toward adulthood, it appears crucial to (a) improve the understanding of factors involved in the occurrence of juvenile sexual offending; (b) develop a sophisticated knowledge about factors that lead to criminal persistence in JSOs; and (c) advance current approaches to assess and estimate risk of criminal recidivism in JSOs.

2. Adverse Childhood Experiences (ACEs)

The role of ACEs in the etiology and persistence of criminal behavior, and particularly sexually abusive behavior, has been repeatedly discussed in the literature (e.g., Baglivio et al., 2014; Baglivio, Wolff, Piquero, & Epps, 2015; Seto & Lalumière, 2010). As an introduction, the following paragraphs will summarize several aspects of the manifold research on ACEs. After defining the meaning of ACEs, their prevalence rates and consequences in the general community will be illustrated.

2.1 Definitions

Across the multitude of studies that exist in the research on ACEs, no clear-cut concept has yet been established that defines what the term ACEs exactly comprises (Kalmakis & Chandler, 2014). ACEs may be operationalized under the concept of several different terminologies that describe different forms of adversities an individual may have to face during his/her childhood and adolescence. Perhaps most prominently, particular forms of ACEs are summarized under the term child maltreatment. According to Leeb, Paulozzi, Melanson, Simon, and Arias (2008), child maltreatment includes “any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” (p. 11). Leeb et al. (2008) consider, for instance, abusive acts like physical abuse, psychological/emotional abuse, and sexual abuse as form of commission, whereas omission is represented by neglectful experiences such as physical or emotional neglect, but also educational neglect or insufficient supervision. Other researchers have broadened the definition of ACEs to also include distinct forms of intra-familial dysfunction, such as living with household members that show substance abuse problems, mental illness, or criminal behavior, and experiences of domestic violence or parental separation/divorce (Dong et al., 2004; Felitti et al., 1998). ACEs have also been examined using the term early life stress; yet,

in addition to ACEs like emotional, physical, or sexual abuse, Heim, Plotsky, and Nemeroff (2004), for instance, subordinate the occurrence of further distressing childhood events, such as accidents, severe illness, natural catastrophes, or terroristic attacks under the concept of early life stress. Recent research has further highlighted the relevance of ACEs that represent disadvantageous peer-experiences like emotional and physical (school) bullying (e.g., Finkelhor, Shattuck, Turner, & Hamby, 2015; Teicher & Parigger, 2015). Reviewing 128 articles published between 1970 and 2013, Kalmakis and Chandler (2014) even found further experiences classified as ACEs, such as racial segregation or community violence. Based on the wide variety of events subsumed under the term ACEs, Kalmakis and Chandler (2014) propose a uniform definition of ACEs as "childhood events, varying in severity and often chronic, occurring within a child's family or social environment that cause harm or distress, thereby disrupting the child's physical or psychological health and development" (p. 1495).

In addition to the heterogeneity of the ACE concept, studies denominating ACEs as traumatic experiences or childhood trauma (e.g., Fox, Perez, Cass, Baglivio, & Epps, 2015) may induce further complication because of the potential danger of confusion with the definitions of psychological trauma and/or resulting clinical syndromes proposed by official diagnostic classification manuals. According to the newest version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), events that may result in a clinical manifestation of a trauma-related disorder (given specific intrusive follow-up symptoms) must include experiences of or witnessing (threatened) death, severe bodily harm, or sexual abuse. The current International Classification of Diseases (ICD-10; World Health Organization, 1993) considers traumatic experiences to be perceived as particularly catastrophic or containing particularly high amounts of threat, leading to severe burden in nearly everybody who experiences suchlike situations or events. There is an ample debate in the literature about what experiences should be classified as potentially traumatic (e.g., Pai, Suris, & North, 2017). ACEs may represent one subcategory of such experiences (e.g., Landolt, Schnyder, Maier, Schoenbucher, & Mohler-Kuo, 2013). More specifically, according to recent proposals for revisions of trauma-related disorders in ICD-11, ACEs that occur repeatedly over an extended period of time may qualify as potential triggers for a specific PTSD type of elevated complexity (Maercker, Brewin, Bryant, Cloitre, Reed, et al., 2013). Overviews of trauma-related disorders for children and adolescents according to DSM-5 and proposals for conceptualizations of trauma-related disorders to be included in ICD-11 are given, for instance, by Goldbeck and Jensen (2017) as well as Maercker, Brewin,

Bryant, Cloitre, Reed, et al. (2013) and Maercker, Brewin, Bryant, Cloitre, van Ommeren, et al. (2013).

Although careful consideration is recommended when interpreting findings from studies with differing ACE definitions, it would be beyond the scope of the present thesis to explicitly explain the exact conceptualization of ACEs used in each single study that is referenced. Most of the following presentations of prevalence rates and consequences of ACEs summarize findings of different studies irrespective of the exact ACE definitions used, including conceptualizations such as maltreatment or early life stress. However, despite somewhat differing conceptualizations, multiple studies on ACEs have led to similar conclusions, e.g., regarding dose-response relationships (e.g., Felitti et al., 1998; Teicher & Samson, 2016) that will be mentioned in more detail below.

The four empirical studies conducted in the framework of the present thesis refer to the categories of ACEs proposed by Teicher and Parigger (2015) as well as the definition of sexual victimization according to Mohler-Kuo et al. (2014). These conceptualizations will be presented in more detail in Chapter B.

2.2 Prevalence rates of ACEs

Children and adolescents are not only at risk of sexual victimization (see above) but they may also experience a multitude of other ACEs that exert short- and long-term effects on their psychological, physical, and social development across the life-span. Thus, ACEs have been considered as a concern of public health (R. Gilbert et al., 2009; Herrenkohl, Leeb, & Higgins, 2016; Lambert, Meza, Martin, Fearey, & McLaughlin, 2017; Moore et al., 2015; Sood & Berkowitz, 2016).

Notwithstanding the sample composition (e.g., age), sampling methods (e.g., college vs. community), or measurement characteristics (e.g., definition of maltreatment or validity of assessment instruments), which have been shown to contribute to the variation of prevalence estimates (Prevoo, Stoltenborgh, Alink, Bakermans-Kranenburg, & van IJzendoorn, 2017), Stoltenborgh et al. (2015) not only reported world-wide life time prevalence rates of sexually abusive experiences before the age of 18 years up to 22%, but also considerable rates of physical abuse (14-55%), emotional abuse (11-47%), physical neglect (7-19%), and emotional neglect (15-40%). Furthermore, peer bullying ranks among the most frequent forms of violent behavior in school-aged youth (Menesini & Salmivalli, 2017). In their recent meta-analysis including 80 studies, Modecki, Minchin, Harbaugh, Guerra, and Runions (2014) found a mean prevalence rate of 35% for the involvement of youth between 12 and 18 years in bullying behaviors. In a Swiss community sample of 43 randomly selected 7th- and

8th-grade classrooms, Sticca and Perren (2013) reported that 53% of those students had been involved in bullying perpetration at some point in the previous four months, and 7% had admitted weekly bullying involvement.

When considering the prevalence of ACEs, one must be aware that ACEs rarely occur in isolation, but most victims are affected by a multiplicity of co-occurring ACEs. Examining a range of ACEs from intra- and extra-familial contexts in a sample of minors representative for the U.S., Finkelhor, Ormrod, and Turner (2007) found that 69% of youth who had reported one form of ACEs also reported experienced of at least one further ACE category during the previous year. Equally, in adults, Felitti et al. (1998) found probabilities of 65% to 93% for having had experienced one ACE form on top of another ACE form at any time in life.

The common occurrence of ACEs is associated with substantial economic costs for victims and society, in large part attributable to health care costs and productivity losses related to the multiple short- and long-term consequences victims of ACEs are burdened with (Fang, Brown, Florence, & Mercy, 2012; Ferrara et al., 2015; Habetha, Bleich, Weidenhammer, & Fegert, 2012; Hillis, Mercy, & Saul, 2017; Jud, Fegert, & Finkelhor, 2016; McCarthy et al., 2016). The following paragraph will give a short overview of potential consequences and will lead over to the particular role of ACEs for the occurrence, maintenance, and prediction of general and sexual aggression, violence, and delinquency.

2.3 Psychological, physical, and social impairments associated with ACEs

Scientific approaches and theories that emphasize the role of ACEs for disadvantageous health and social outcomes have been discussed for more than 100 years. In the late 19th century, Sigmund Freud proposed associations between sexual victimization and the development of so-called hysteria or neurosis (1896/1962). In the midst of the 20th century, Kempe, Silverman, Steele, Droegemueller, and Silver (1962) established the term “battered-child syndrome” (p. 105) to describe the detrimental consequences of severe physical abuse on children. Kempe and colleagues’ (1962) publication has been considered “a crucial turning point” (p. 51) as it called the attention of clinical and legal professions toward the issue of maltreatment (Dubowitz, 2013).

A vast body of contemporary research has expanded the scientific knowledge on the associations of ACEs with a broad range of negative health and social outcomes. Most notably, Felitti and Anda’s pioneering Adverse Childhood Experiences (ACE) Study (e.g., Felitti et al., 1998), which is based on data from more than 17,000 adult participants, has revealed a considerable number of far-reaching distinct and cumulative effects of different ACEs on one’s physical (e.g., liver disease; Dong, Dube, Felitti, Giles, & Anda, 2003), psychological

(e.g., depression; Chapman et al., 2004), and social (e.g., job-related impairments; Anda et al., 2004) problems. More than 50 studies have yet been published from this ongoing project, listed on the website of the Centers of Disease Control and Prevention (https://www.cdc.gov/violenceprevention/acestudy/index.html). The authors of the ACE study suppose ACEs to build the foundation for a cascade of processes which range from anomalous neurodevelopment over impaired emotional, social, and cognitive abilities to the engagement in health-risk behaviors, which again increase the probabilities of maladaptive health and social outcomes, finally leading to premature death (e.g., Anda et al., 2006; Felitti et al., 1998; see Fig. 1). Felitti (2002) even concluded that ACEs may be "one of the most important, if not the most important, determinants of the health and well-being" (p. 46).

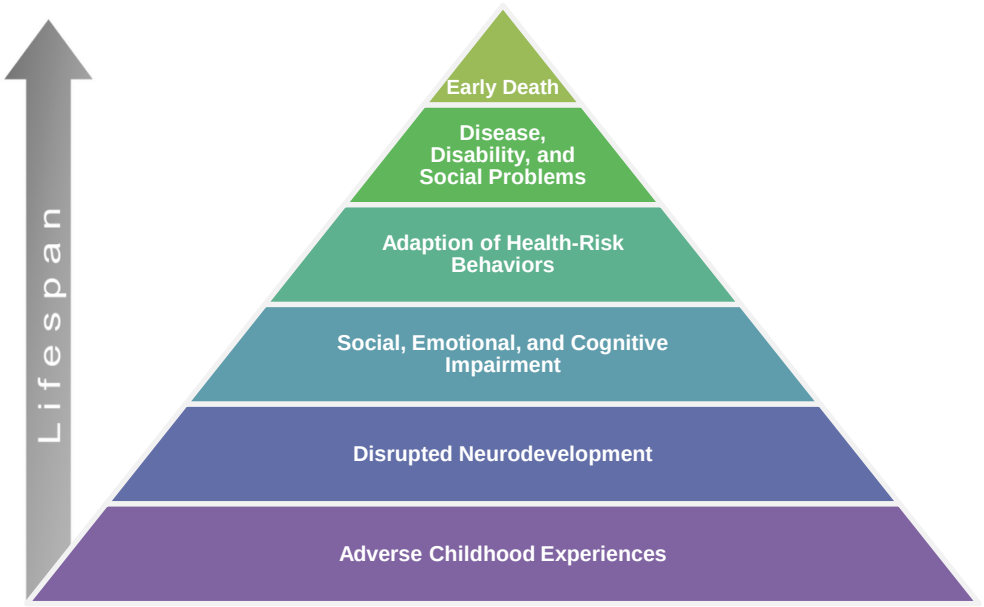

Figure 1. The cascade of impairments due to ACEs across the life-span. Adj. from http://www.cdc.gov.

Further research on diverse samples has underscored the specific and cumulative negative effects of ACEs on various health-related outcomes from early childhood to adulthood (Finkelhor et al., 2007; Hughes, Hardcastle, & Bellis, 2016; Kerker et al., 2015; Merrick et al., 2017). More specifically, ACEs have been associated with increased risk of psychological and physical health impairments including depression and anxiety, suicidal tendency, dissociative symptoms, PTSD, attention deficit hyperactivity disorder (ADHD), substance abuse, coronary heart disease, diabetes, obesity, but also re-victimization (Ballard et al., 2015; Bielas et al., 2016; Danese & Tan, 2014; Finkelhor et al., 2007; Finkelhor et al., 2015; Fuller-Thomson & Lewis, 2015; Garrido, Weiler, & Taussig, 2017; L. K. Gilbert et al., 2015;

Koskenvuo & Koskenvuo, 2015; Lucenko, Sharkova, Huber, Jemelka, & Mancuso, 2015; Merrick et al., 2017; Metzler, Merrick, Klevens, Ports, & Ford, 2017; Schalinski et al., 2016; Schilling, Aseltine, & Gore, 2007; Teicher, Samson, Sheu, Polcari, & McGreenery, 2010). Not only intra-familial ACEs but also extra-familial experiences such as being victimized by peer bullying have been found to exert significant effects on increased risk of health impairments (e.g., Bogart et al., 2014; Burke, Sticca, & Perren, 2017; Schwartz, Lansford, Dodge, Pettit, & Bates, 2015).

Furthermore, a growing body of research has investigated potential neurological, neurophysiological, hormonal, and epigenetic alterations and mechanisms that may be responsible for the link between ACEs and several negative outcomes (e.g., Blaze, Asok, & Roth, 2015; Danese & McEwen, 2012; Hein & Monk, 2017; Heleniak, Jenness, Vander Stoep, McCauley, & McLaughlin, 2015; Matz et al., 2010; McLaughlin, 2016; Radtke et al., 2015; Teicher & Samson, 2016; Teicher et al., 2010; van der Knaap et al., 2015). Teicher and Samson (2013, 2016) suggested that particular ACEs may exert specific effects on brain areas that contribute to the processing of these ACEs (e.g., systems associated with the processing of stress such as the amygdala), causing epigenetic, anatomical, and functional alterations that may serve as adaptations to ensure basic functioning when confronted with additional ACEs on the one hand, but finally affect the manifestation of certain negative long-term developmental outcomes on the other hand.

In a similar way, the concept of a latent vulnerability that follows the occurrence of ACEs has been proposed (McCrory, Gerin, & Viding, 2017; McCrory & Viding, 2015). According to this concept, alterations in brain structure and functioning appear adaptive with regard to responding to current ACEs but may put individuals at risk of enduring susceptibility to subsequent stressful experiences. This latent, non-specific vulnerability may not be noticeable for a considerable amount of time but may be triggered in upcoming stressful situations. In the absence of potentially protective factors, the interaction of vulnerability and acute stress may contribute to the occurrence of symptoms of poor (mental) health. Moreover, ACEs have been found to negatively influence endocrine and immune systems causing enduring allostatic load, which again has been associated with long-term health impairments (Danese & McEwen, 2012; Widom, Horan, & Brzustowicz, 2015).

Overall, these concepts may be classified under the diathesis-stress model, an approach that has been originally proposed to explain the interaction effects between steady dysfunctional predispositions and acute stress in the development of schizophrenia but has

been broadened for the application with other negative health outcomes, too (e.g., Monroe & Simons, 1991; Rosenthal, 1963).

Theories that emphasize interactions between previous ACEs and current stress presume a certain time-dependency of the effects that ACEs exert on developmental outcomes. Indeed, multiple studies have led to the proposition that effects of ACEs on brain development, neurophysiological functioning, and allostatic load may differ according to the timing and duration of their occurrence (Danese & McEwen, 2012; Pechtel, Lyons-Ruth, Anderson, & Teicher, 2014; Rao, Hammen, Ortiz, Chen, & Poland, 2008; Teicher & Samson, 2013, 2016). Time-dependent effects of ACEs have also been found with regard to clinical manifestations, e.g., internalizing and externalizing behaviors, depression, anxiety, suicidal tendency, dissociative symptoms, PTSD, substance use, and somatic problems (Dunn, McLaughlin, Slopen, Rosand, & Smoller, 2013; Flaherty, Thompson, Dubowitz, & et al., 2013; Grasso, Dierkhising, Branson, Ford, & Lee, 2016; Harpur, Polek, & van Harmelen, 2015; Khan et al., 2015; Schalinski et al., 2016; Wolitzky-Taylor et al., 2017).

3. The Role of ACEs in General and Sexual Offending of Adolescents

3.1 The link between ACEs and antisocial behavior in community samples

In addition to the multiple associations found between ACEs and health or social outcomes (see above), specific and cumulative ACEs have also been related to increased short- and long-term risk of antisocial behavior, violence perpetration, and delinquency in community samples (Ballard et al., 2015; Duke, Pettingell, McMorris, & Borowsky, 2010; Fang & Corso, 2007; Horan & Widom, 2015; Lansford et al., 2007; Layne et al., 2014; Mersky & Reynolds, 2007; Schilling et al., 2007). In a recent research project that the author of the present thesis has cooperated in (Aebi et al., 2017), a cumulative score of several ACEs (in terms of potentially traumatizing experiences including accidents or natural catastrophes) was found to be positively associated with increased risk of self-reported violence perpetration in a representative sample of community youth in Switzerland.

From a neurological/neurophysiological perspective, the ACE-violence link may be explainable by the assumptions that ACEs (a) effect brain areas related to stress-processing, and thus impair emotion regulation and promote biased threat perception; and (b) increase risk of allostatic load or latent vulnerability; consequently, these alterations may increase the risk of rather inadequate (violent) responses to actually insignificant but subjectively imperiling cues (e.g, Danese & Tan, 2014; Fox et al., 2015; McCrory et al., 2017; McCrory & Viding, 2015; Teicher & Samson, 2013, 2016). Similar to findings on health outcomes, ACEs

are assumed to exert type- and time-dependent effects on antisocial/delinquent behavior (e.g., Grasso et al., 2016).

3.2 ACEs in adolescents with general (nonsexual) delinquency

Prevalence rates and associations with health outcomes and crime

The associations of ACEs with violent behavior in community youth suggest that specific samples of antisocial or delinquent juveniles may show particularly high burden of ACEs. Indeed, various studies have found that prevalence rates of ACEs in juvenile offender samples exceeded those found in the general community (Aebi, Linhart, et al., 2015; Baglivio et al., 2014; Bielas et al., 2016; Dierkhising et al., 2013).

In a recent study that the author of the present thesis collaborated in as co-first author (Bielas et al., 2016), the prevalence of the 10 ACE categories of Felitti and Anda's original ACE study (e.g., Dong et al., 2004; Felitti et al., 1998; see above) and their relations to psychiatric disorders (under consideration of irritability symptoms) were examined in a Swiss juvenile detention sample. Among the 130 participating male adolescents (aged 13.8–19.5 years), we found about 92% to report at least one life-time ACE, and 75% to report two or more ACEs. The increase of one standard deviation on the cumulative ACE scale was associated with approximately doubled odds for showing depression, anxiety disorders, PTSD, and suicidal tendency. We further found some indications of shared influences of ACEs and irritability on the occurrence of mental health problems in these detained juveniles. In an Austrian detention sample, juvenile inmates reported ACE prevalence rates as high as 48.5% for emotional abuse, 27.7% for physical abuse, and 13.5% for sexual abuse, reflecting a greater burden of ACEs compared to their non-delinquent peers (Aebi, Linhart, et al., 2015). ACEs were further found to be related to psychiatric disorders as well as criminal recidivism in this study (Aebi, Linhart, et al., 2015).

The research group around Michael Baglivio and Nathan Epps has recently published a series of studies that examined the role of ACEs in a comprehensive sample of more than 64,000 justice-involved adolescents from Florida. They found high rates of ACEs with only 2% of female and 3% of male juveniles without any ACE experience (Baglivio & Epps, 2016; Baglivio et al., 2014). Moreover, they highlighted the considerable portion of delinquent juveniles who are poly-victimized: Of those adolescents who stated to have experienced at least one ACE, nine out of 10 juveniles reported at least two, about three quarters at least three, half at least four, one third at least five, and one quarter at least six ACEs (Baglivio & Epps, 2016; Baglivio et al., 2014). Comparing these ACE rates to those found in Felitti and Anda's (e.g., Dong et al., 2004; Felitti et al., 1998; see above) adult community sample,

they found the justice-involved juveniles to have four times the risk of having experienced at least four ACEs, and to have about 13 times decreased probabilities of not having experienced any ACE at all (Baglivio & Epps, 2016; Baglivio et al., 2014). The research group further reported cumulative ACEs to be associated with early-onset and violent delinquency as well as criminal persistence up to adulthood (Baglivio et al., 2015; Fox et al., 2015; Wolff & Baglivio, 2016).

Research from other groups supports the findings of high prevalence rates of ACEs and their relations to the courses of criminal behavior in general juvenile offender samples (e.g., Kingree, Phan, & Thompson, 2003; van der Put & De Ruiter, 2016). Some of those studies have also considered the timing of ACEs in their relation to the course of criminal behaviors, highlighting the specific role of chronic ACEs and ACEs that occur in or endure until adolescence (J. P. Ryan, Williams, & Courtney, 2013; Stewart, Livingston, & Dennison, 2008; Thornberry, Ireland, & Smith, 2001).

Theoretical models that relate ACEs to general delinquency

Considering the associations of ACEs and antisocial behavior in community and juvenile offender samples as well as the high prevalence rates of ACEs in delinquent adolescents, it is not surprising that a multitude of theoretical frameworks have been developed that try to explain how ACEs contribute to the engagement in violent, aggressive, and/or delinquent behaviors. The following paragraphs present a proportion of models and theories that have been repeatedly discussed in the pertinent research.

The cycle of violence

First introduced by Cathy S. Widom in the late 1980s, the theory of a cycle of violence has been repeatedly updated and still contributes to the current scientific debate concerning the explanation of the ACE-delinquency link (e.g., Maxfield & Widom, 1996; Widom, 1989; Widom, 2017; Widom & Maxfield, 2001). The basic assumption of the theory is that "yesterday's victims become tomorrow's offenders and perpetrators of violence" (Maxfield & Widom, 1996, p. 395). This assumption has been empirically tested in multiple studies. An early example is Widom's (1989) cohort study including 908 participants with officially registered cases of abuse and neglect before the age of 11 years as well as data on crime involvement up to 20 years later. Compared to a control group without ACE experiences, individuals with ACEs were at increased risk of delinquency and violent crime. More specifically, the latter showed increased rates of offending, earlier onset of crime, and were more likely involved in persistent crime. Yet, no differences emerged between groups with regard to re-offense risk. Widom (1989) concluded that data supported the assumption of a

cycle of violence but also pointed to the fact that a considerable number of individuals with ACE burden did not become delinquent, and thus highlighted the examination of different ACE-related manifestations as well as potential mediators of the ACE-delinquency link. A follow-up study conducted six years later reinforced the given findings (e.g., Widom & Maxfield, 2001). Moreover, Widom and Maxfield (2001) outlined that for individuals with ACEs the risk of any arrest was enhanced by 59% for adolescent delinquency, 28% for adult delinquency, and 30% for violent delinquency in general compared to individuals without ACEs. They further highlighted that the risk of violent delinquency was higher in individuals who had experienced physical abuse and neglect than in individuals who had experienced sexual abuse.

Despite the growing body of literature that supports the associations between ACEs and crime involvement, the cycle of violence assumption has not been free of criticism. For instance, Thornberry, Knight, and Lovegrove (2012) have stressed not to accept this theory offhandedly because of various methodological limitations given in according studies (e.g., the sole reliance on retrospective reports of ACEs or the lacking representativeness of assessed samples). In her latest publication on the cycle of violence, Widom (2017) reviewed the current knowledge on the ACE-delinquency link and emphasized potential improvement opportunities for research on the cycle of violence, e.g., the implementation of sophisticated study designs that allow comparability across studies, the focus on the operationalization of criminal behavior, the consideration of both the types and the number of ACEs as well as the complexity within their associations with criminal behaviors, or the time-dependencies of ACE effects on delinquency.

Widom (2017) further states several theoretical models that aim to explain the etiological mechanisms behind the ACE-delinquency link, namely Social Learning Theory, Social Control Theory, General Strain Theory, and Gene-Environment interactions. Moreover, the Social Information-Processing Model (Crick & Dodge, 1994; Dodge, 1984) proposes particular (cognitive) processes as the basis for the associations of ACEs with aggression and delinquency. The following paragraphs will shortly introduce each of these theories and summarize their empirical support.

Social Learning Theory (SLT)

The basis of SLT was established by Albert Bandura's notion that people acquire a repertoire of aggressive behaviors by observing others performing such behaviors as well as recognizing potentially reinforcing consequences associated with these behaviors (Bandura, 1973, 1978). Bandura (1978) suggests that based on such learning experiences, aggression

may be perceived as beneficial means to achieve desired outcomes. Related to these assumptions, it may be proposed that individuals who experience ACEs, e.g., perpetrated by their parents, may learn that situations of interpersonal conflict or stress appear resolvable by applying violence (e.g., Widom, 2017).

SLT has been specifically adapted in the field of crime research (e.g., Akers, 1973). Nicholson and Higgins (2017) give an overview over the development of SLT for criminal behaviors (SLTC). For instance, they refer to Akers (2009), who summarizes the basic assumption of his SLTC as follows:

> The probability that persons will engage in criminal and deviant behaviors is increased and the probability of conforming to the norm is decreased when they differentially associate with others who commit criminal behavior and espouse definitions favorable to it, are relatively more exposed in-person or symbolically to salient criminal/deviant models, define it as desirable or justified in a situation discriminative for the behavior, and have received in the past and anticipate in the current or future situation relatively greater reward then punishment for the behavior. (p. 50)

Thus, SLTC explicitly incorporates elements of Bandura's SLT (Bandura, 1973, 1978), Skinner's (1953) theory on operant conditioning, and previously proposed approaches about reinforcement based on differential associations in the framework of crime (Burgess & Akers, 1966). In their meta-analysis of 133 studies published between 1974 and 2003, Pratt et al. (2010) state empirical support for some elements of SLTC (i.e., antisocial definitions and differential associations) but not for others (i.e., imitation and reinforcement). Nicholson and Higgins (2017) further describe how Akers (2009) expanded his theory by giving more importance to the social environment of an individual, which contributes to the course of social learning, and thus to the development of criminal behavior. Yet, Nicholson and Higgins (2017) point out that empirical evidence of this Social Structure Social Learning Theory is lacking because no existing study has included this approach to its full extent.

Social Control Theory (SCT)

SCT, introduced by Hirschi (1969), has been considered as "a benchmark for theory construction and research in the delinquency field" (Wiatrowski, Griswold, & Roberts, 1981, p. 525). Costello (2017) has recently published an overview over the basic components of SCT, highlighting that SCT assumes that (a) the self-directed urge to achieve positively evaluated goals and avoid negatively evaluated goals is predisposed in every person; (b) the de-

sistence from rule-breaking or criminal behavior as a means to pursue these urges depends on the strength of social solidarity and inclusion; (c) this strength of social integration is largely influenced by the quality of an individual's attachment to relevant others, such as parents or peers; (d) weak attachments reduce the commitment to societal rules, and thus elevate the risk of criminal behaviors. The link between poor attachment and delinquency has been supported by empirical findings, such as those from Hoeve and colleagues' (2012) meta-analysis of 63 independent studies. Hoeve et al. (2012) also point to Bowlby's work that has related poor parental attachment to elevate risk of maladaptive outcomes such as antisocial behavior (Bowlby, 1944, 1973). The link between poor attachment and delinquency is relevant to the explanation of the effects of ACEs on delinquency because the occurrence of ACEs has been associated with poor attachment (e.g., Cyr, Euser, Bakermans-Kranenburg, & Van IJzendoorn, 2010).

Empirical support for SCT is, however, inconclusive. Agnew (1991) stressed that at that time, evidence in favor of SCT had primarily been based on cross-sectional findings, and his longitudinal examination found the role of social bonds to be rather non-influential with regard to juvenile delinquency. More recently, Rebellon and Van Gundy (2005) identified a longitudinal association between the experience of physical abuse and crime perpetration, which was, however, not influenced by social bonds. Greenberg (1999) conducted a reanalysis of Hirschi's (1969) data and concluded that SCT may not be incorrect but insufficient for the explanation of delinquency despite its popularity in crime research.

General Strain Theory (GST)

In contrast to early strain theories that have focused on distress due to the hindrance of economic goals as an explanatory factor of crime (e.g., Merton, 1938), GST (e.g., Agnew, 1992, 2001) states that delinquency may represent one potential form of reaction to distressing emotional states caused by negatively valued factors of social relationships that are not avoidable or controllable, such as ACEs. Not only does GST include acute strain in the explanation of crime, GST also proposes that early and/or enduring negative social experiences may put an individual at risk of developing a steady vulnerability for strain, e.g., represented by impaired coping skills for distress. Thus, GST represents a life course perspective on the relations between ACEs and delinquency (Hollist, Hughes, & Schaible, 2009) and may also be conceptualized under the framework of diathesis-stress approaches (Aseltine, Gore, & Gordon, 2000).

Aseltine et al. (2000) tested the application of GST in a prospective study of an adolescent school sample. Their definition of strain not only included different types of ACEs

(e.g., sexual abuse or familial crime involvement) but also more general distressing life events such as school or financial problems. Results casted the generalizability of GST into doubt because negative emotional states (e.g., anger) that followed distressing life events were associated with increased risk of serious crime but not with minor misdemeanors or substance abuse. Hollist et al. (2009) found cross-sectional associations of ACEs and delinquency in a sample of 1,423 adolescents that, however, where unaffected by the effects of negative emotional states and other individual and familial characteristics. Thus, GST was only partially supported by these findings.

Addressing the inconclusive research on the effects that may influence the model parameters of GST, Agnew (2013) has recently extended his theory. GST now includes certain aspects of previously mentioned crime theories such as SLTC (e.g., Akers, 1973) and SCT (Hirschi, 1969). For instance, Agnew (2013) argues that the probability of crime involvement may not only be increased due to the effects of adverse experiences on negative emotional states, but also by their potential to impair parental attachment (decrease of social control) and to promote the connection with delinquent models (increased risk of social learning). Moreover, cognitive appraisals of experienced strain are included, hypothesizing that strain which is perceived to be of high personal relevance should exert more detrimental effects. ACEs are considered to be of particular relevance for the development of delinquency because they may represent such strain of elevated extent (e.g., depending on frequency, severity, and endurance) most likely perceived as unjustified or unfair. Agnew (2013) concludes that the current GST puts emphasis on the convergence of various factors that increase the risk of criminal conduct in conjunction: (a) the occurrence of experiences that trigger strain; (b) the perception of strain as high in extent and as unjustified or unfair; (c) situations that motivate a person to engage in crime (i.e., high chance of advantageous and low risk of disadvantageous consequences); and (d) personal characteristics that influence engagement in dysfunctional coping. A recent empirical test of the extended GST (Ousey, Wilcox, & Schreck, 2015) did support the relationship between victimization and (violent) crime involvement, but did not find evidence for mediating effects of other proposed risk factors (including family bonds, associations with delinquent peers, or deviant attitudes).

Gene-Environment interactions

Already in 1978, Cloninger, Reich, and Guze concluded that "data from adoption, twin, family[,] and general population studies indicate[d] that genetic factors, environmental factors common to family members, and extrafamilial environmental factors (including individual and sociocultural) … are all important" (p. 226) for the explanation of delinquent and

antisocial behavior. Beaver, Schwartz, and Gajos (2015) have recently published a review on the current state of knowledge concerning the conjoined influence of genetic and environmental factors on the development of crime. Among others, they emphasized the seminal longitudinal study by Caspi et al. (2002) who found that the effects of intra-familial ACEs (considered as maltreatment) on antisocial behavior were greater in male participants with rather low (compared to participants with high) expressions of the monoamine oxidase A (MAOA) enzyme. A comprehensive meta-analysis has recently supported this gene-environment interaction (Byrd & Manuck, 2014). Beaver et al. (2015) additionally pointed to further gene-environment interactions including levels and release of dopamine or serotonin on the one hand and experiences with or influences of family members or peers on the other hand. However, they reason that research concerning the combined effects of genetic and environmental features on crime development is far from being conclusive (Beaver et al., 2015). For instance, despite the growing interest concerning the role of ACEs for epigenetic variations leading to poor mental health (Nemeroff & Binder, 2014), Beaver et al. (2015) have pointed out that there is currently no study that has investigated the dynamics between environmental influences, epigenetic variations, and delinquent behavior in humans. Recently, Fox (2017) has proposed to combine abovementioned biosocial theories, e.g., with SLT in order to gather a comprehensive model of the etiology of antisocial behavior and crime.

Social Information-Processing Model (SIP)

SIP (e.g., Crick & Dodge, 1994; Dodge, 1986) has been considered as one of "the most widely studied models" for the explanation of aggressive behaviors (Teisl & Cicchetti, 2008, p. 2). In short, the empirically-based SIP proposes that the engagement in aggressive behavior reflects one possible response to a cascade of processes occurring in a social situation: (a) situational external and internal cues are encoded; (b) these cues (the situation) are interpreted; (c) a goal (preferable outcome) to solve the situation is determined; (d) possible reactions to the situations are retrieved from memory or newly constructed (potentially but not necessarily related to the determined goal); (e) these reactions are compared against each other regarding their usefulness in the present situation; (f) the most preferable reaction is chosen and executed (Crick & Dodge, 1994). It is further assumed that besides particular biologically-based predispositions, memories of previous (social) experiences influence the processing cascade at several stages. Equally, the outcomes of the current situation will be integrated into this memory structure and influence the cascade in future social situations (e.g., Crick & Dodge, 1994). ACEs are assumed to contribute to deviating information processing which leads to the engagement in aggressive behaviors. Based on their empirical findings in a

sample of pre-school children that were followed for five years, Dodge, Bates, and Pettit (1990) and Dodge, Pettit, Bates, and Valente (1995) stressed that experiences of childhood physical abuse may have the potential to narrow a child's attention toward hostile situational cues while limiting the perception and encoding of other important stimuli, promote hostile interpretations of the situation, facilitate the retrieval of aggressive reactions, and contribute to the perception of aggression as a functional means to solve social conflict.

Regarding the empirical support of SIP, the authors themselves emphasize that SIP displays a rather heuristic approach that must not be investigated in its entirety but according to its single process components and their joint contributions to the development of aggression (e.g., Dodge, 1986). They highlight the comprehensive empirical foundation that SIP was based on and underscore the robust findings in favor of SIP despite varying construct operationalizations across studies (Crick & Dodge, 1994). The interpretation of social cues is one process component that has received major scientific interest (Teisl & Cicchetti, 2008). More specifically, a vast body of research has shown that the tendency to impute hostile intentions to others in ambiguous or non-hostile situations (often referred to as *hostile attributional bias*; e.g., Nasby, Hayden, & DePaulo, 1980) is positively associated with the probability of aggressive behavior in community and clinical samples of children, adolescents, and adults (for an overview, see, e.g., Dodge, 2006). In a sample of male detained juvenile offenders (M_{age} = 16.6 years), Dodge, Price, Bachorowski, and Newman (1990) found evidence for positive associations of hostile attributional biases with conduct disorder as well as with the engagement in violent crime and reactive aggression but not with non-violent crime or proactive aggression. Slaby and Guerra (1988) compared the social problem solving skills of male and female violent juvenile offenders (M_{age} = 17.08 years) to those of aggressive and nonaggressive community youth samples and found that violent juvenile offenders had the highest chance of interpreting hostile intent to the given situations and favoring hostile/aggressive problem solving strategies and attitudes. In addition, the authors also found promising effects for an intervention aimed at reducing such deficiencies in juvenile offenders (Guerra & Slaby, 1990).

Dodge (2006) proposed a theory to explain the development of hostile attribution tendencies based on empirical findings from diverse fields of research such as developmental, social, and personality psychology, neuroscience, and ethology. According to this theory, attributing hostile intent to others whose actions are potentially harmful displays a normative process in infancy because of yet underdeveloped social cognition capabilities. Thus, adopting the ability to interpret harmful actions of others as non-hostile or unintended reflects one

developmental goal that has to be achieved through learning processes. However, ACEs (i.e., physical abuse) may, among other factors, impede the achievement of this goal, e.g., due to the adoption of hostile attributions modeled by relevant adults (Dodge, 2006). Several studies have proven a link between ACEs (especially physical abuse) and increased risk of showing hostile attributions in samples including minors and young adults (e.g., Price & Glad, 2003; Richey, Brown, Fite, & Bortolato, 2016; Teisl & Cicchetti, 2008). However, researchers have also emphasized that not all ACE types may relate to deficiencies in cognitive components such as hostile attributional biases (e.g., neglect; Price & Glad, 2003) but some may rather effect affective components (e.g., deficient emotion regulation) that influence the link between ACEs and aggressive behavior (e.g., Lee & Hoaken, 2007; Teisl & Cicchetti, 2008). In fact, although the authors of the SIP underscore that affective components influence all the proposed cognitive processes (Crick & Dodge, 1994), other researchers have criticized SIP for not addressing those affective components in sufficient detail (e.g., Lemerise & Arsenio, 2000).

3.3 ACEs in JSOs

Prevalence rates

As outlined above, histories of ACEs are more common in juveniles involved in the justice system than in community samples (e.g., Baglivio et al., 2014). Among delinquent juveniles, JSOs appear to be specifically burdened with ACEs. A vast body of research indicates that JSOs show considerably higher rates of ACEs compared to other juvenile offender groups. In their meta-analysis of 59 independent studies, Seto and Lalumière (2010) compared the occurrence of ACEs between a total of 3,855 JSOs and 13,393 nonsexually delinquent juveniles. They found that on average JSOs had experienced significantly higher rates of physical abuse (d = 0.19), emotional and physical neglect (d = 0.28), exposure to intrafamilial sexual violence (d = 0.24), and especially sexual victimization (d = 0.62; approximately 5-fold odds)[3]. Equally, Righthand and Welch (2001) underscored the common occurrence of physical abuse, sexual victimization, and a wide range of other adverse family characteristics in JSOs. Other researchers have additionally accentuated the occurrence of extrafamilial ACEs among JSOs such as bullying (e.g., Hendriks & Bijleveld, 2004). Moreover, JSOs have rarely experienced single ACEs but a considerable number of these juveniles is burdened with multiple ACEs (Rasmussen, 2013).

[3] Interpretation of effect sizes according to Cohen (1988): small (d = 0.20-0.50), moderate (d = 0.50-0.80), large ($d \geq 0.80$).

Levenson, Willis, and Prescott (2016) have recently highlighted the role of ACEs in individuals who have sexually offended by comparing the ACE histories of adult male sex offenders to those of the community sample used in the abovementioned ACE study (e.g., Felitti et al., 1998). Sexually delinquent males had considerably higher rates of childhood sexual victimization (approximately 3-fold odds), physical abuse (approximately 2-fold odds), verbal abuse (approximately 13-fold odds), and emotional neglect (approximately 4-fold odds). Furthermore, this study found that almost 50% of the sex offender sample reported four or more ACEs, whereas only 16% reported no ACE at all.

Theoretical models that relate ACEs to sexual delinquency

The notion of the high prevalence rates of ACEs in individuals who have sexually offended has contributed to the development of multiple theoretical models that aim at explaining how ACEs may relate to the occurrence of sexual delinquency apart from general delinquency. Most of those assumptions are based on models that try to explain the link from ACEs to general offending (see above) but include specific risk factors suggested to be associated with sexual delinquency in particular. The following paragraphs will shortly introduce some of the models often discussed in pertinent research.

Victim-to-victimizer/abused-abuser hypothesis

The basic assumption of the victim-to-victimizer or abused-abuser hypothesis is that own experiences of sexual victimization lead to the development of sexual abuse perpetration. An early formulation of this relationship has been proposed by Freeman-Longo (1986) who hypothesized a sexual abuse cycle similar to other findings of the research on ACEs, such as the associations of physical abuse with later abusive parenting behaviors. He assumed that sexual aggression is learned and related to feelings of powerlessness and lack of control. Gail Ryan and colleagues (e.g., G. Ryan, 1989; G. Ryan, Lane, Davis, & Isaac, 1987) explicitly conceptualized a sexual abuse cycle that explained sexual perpetration as consequence of negative self-perceptions, social isolation, deviant fantasies, and subjective feelings of lacking power and control. More specifically, the theory assumes that (a) similar emotions and cognitions that were present during experienced victimization may be triggered by events that remind the individual of these victimization experiences and start the maladaptive cycle by creating feelings of negative self-perceptions; (b) the anticipation of future adversity, especially in social relationships, promotes social withdrawal in order to avoid or keep control over potential risk; (c) social isolation forwards negative emotional states such as feeling angry about the situation, which again fosters negative attitudes toward others (e.g., blaming the perpetrator for the situation) and/or self-enhancing fantasies in terms of payback-attitudes; (d)

these fantasies go over into planning and finally performing actions that are thought to make oneself feel better and/or more powerful, which may be self-directed (e.g., substance abuse) or externalized (e.g., sexual perpetration); (e) after temporary feelings of relief, anticipated consequences again lead to negative self-perceptions and feelings of lacking power and control, which set the individual (despite potential resolutions to not repeat the behavior) at the negative emotional state that has started the cycle (Figure 2).

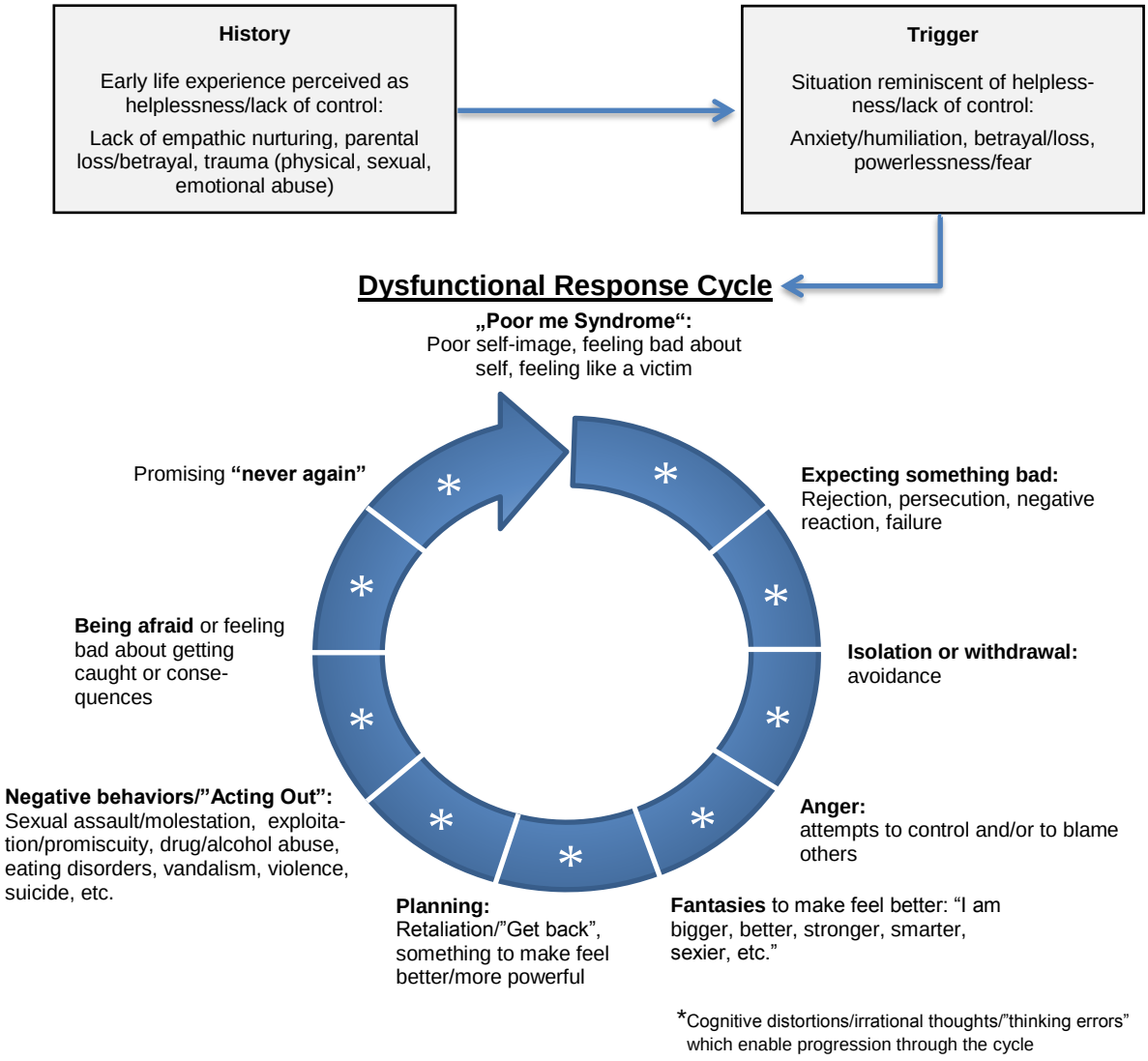

Figure 2. Sexual abuse cycle. Adj. from G. Ryan (1989, p. 329).

It must be noted that this cycle conceptualizes sexual abuse perpetration as one possible outcome in the aftermath of several ACEs, and thus maintains that not all victims of ACEs (including sexual victimization) become later perpetrators of sexual abuse. However,

the authors (G. Ryan, 1989; G. Ryan et al., 1987) explain that the experience of sexual victimization may be of specific importance for the engagement in sexually abusive behaviors: For instance, the deviant behavior of the offender may exert long-term negative impact on the victim's cognitions and attitudes toward sexuality, especially because sexual victimization is commonly experienced in secrecy which prevents the victim from disclosing the victimization to anyone who could help to appropriately process the experience. Thus, the victim may perceive the perpetration of sexual aggression as a justified means to reestablish the power and control that was taken from him/her by the perpetrator of his/her sexual victimization. Furthermore, the coexistence of sexual experiences and negative emotions and/or aggression may contribute to the occurrence of sexual arousal in situations that elicit similar negative states, and affirm the link between sexuality, negative emotionality, and aggression in the long run.

Although to the best of the author's knowledge, no study has yet empirically examined this sexual abuse cycle to its full extent, a vast body of research has supported the link between sexual victimization and sexual abuse perpetration. For instance, Aebi, Landolt, et al. (2015) reported a strong association of self-reported contact and non-contact sexual victimization with later sexual abuse perpetration for male and female participants in a representative sample of 9th-grade students from Switzerland. Examining representative samples of male Swedish and Norwegian high school students, Seto et al. (2010) concluded that sexual victimization was a consistent predictor of subsequent engagement in sexual coercion, with victimized youth holding a three-fold risk of later sexual abuse perpetration. Ogloff, Cutajar, Mann, and Mullen (2012) followed 558 male victims of childhood sexual victimization into adulthood and found a strong relationship between sexual victimization and later sexual abuse perpetration. Individuals who had experienced sexual victimization at the age of at least 12 years were of particular risk of subsequent engagement in sexual offending. Moreover, D. L. Burton (2003) found 179 male adolescents who were both victims and perpetrators of sexual abuse to be likely to resemble certain characteristics of their own victimization in their offending, e.g., with regard to victim selection.

However, research has also criticized the specific importance of sexual victimization in subsequent sexual abuse perpetration. It has been highlighted that (a) only a small fraction of sexually victimized individuals (especially in case of female victims) become perpetrators of sexual abuse; (b) not every perpetrator of sexual abuse has been sexually victimized him-/herself; (c) sexual victimization is not specifically related to sexual abuse perpetration but also to other types of crime; and (d) other ACEs such as physical abuse or neglectful experi-

ences, and moreover their accumulation, show associations with increased risk of later sexual abuse perpetration (e.g., Borowsky, Hogan, & Ireland, 1997; D. L. Burton, Miller, & Shill, 2002; Leach, Stewart, & Smallbone, 2016; Ogloff et al., 2012; Widom & Massey, 2015). Thus, it appears that research rather supports the abovementioned abuse cycle (G. Ryan, 1989; G. Ryan et al., 1987) in its more general form (including several ACEs and several potential outcomes) than in its specific focus on sexual abuse victimization and perpetration. In their recent review, Plummer and Cossins (2016) conclude that the probability of the link between sexual victimization and sexual offending for male individuals may yet be increased when at least one of the following dispositions is met: (a) sexual victimization has occurred at the age of at least 12 years; (b) sexual victimization has been experienced frequently and/or with great severity; or (c) sexual victimization has been experienced within a relationship of dependence. Plummer and Cossins (2016) further outline that sexual victimization may exert particular effects on the victim's cognitions and attitudes toward sexuality when (a) sexual victimization displays the main sexual experience in the life-course of the victim; (b) the perpetrator represents the primary influence of the victim with regard to sexuality; and (c) sexuality is associated with negative affect and loss of power for the victim. Taken together, "sexual victimization should not be seen as a necessary nor sufficient causal variable for the development of adolescent sexual offending" (D. L. Burton et al., 2002, p. 895).

Confluence Model

The Confluence Model has been considered as one of the most frequently replicated etiological frameworks for sexual aggression (e.g., Bramsen, Lasgaard, Koss, Elklit, & Banner, 2014; Casey, Beadnell, & Lindhorst, 2009). It has been first introduced by Malamuth, Sockloskie, Koss, and Tanaka (1991) as an explanatory approach toward the development of male aggression perpetrated against women. According to the authors (Malamuth, Linz, Heavey, Barnes, & Acker, 1995; Malamuth et al., 1991), the model assigns a basic role to early abusive experiences (e.g., sexual victimization and physical abuse) in the development of later nonsexual and sexual aggression toward women, as those experiences may promote negative attitudes toward interpersonal relationships between men and women, shame concerning sexuality, and the urge to maintain control over intimate partners. Furthermore, growing up in abusive environments may increase the risk of affiliation with delinquent peers, and thus the risk of committing criminal behaviors. The company of delinquent peers may exaggerate hostile attitudes toward women. In addition, the risk of sexual aggression against women may be particularly elevated when sexuality is perceived as a means to pursue popularity among peers or boost one's feelings of self-worth. In short, ACEs may con-

tribute to delinquent behavior in general, which again increases the risk of sexually coercive behavior against women by the confluence of two distinct paths: (a) the *hostile masculinity path*, which describes, e.g., dismissive attitudes toward women, and (b) the *promiscuous-impersonal sex path*, which describes, e.g., uncommitted attitudes toward sexuality. In total, the Confluence Model has been considered as a comprehensive framework for the explanation of (sexual) aggression against women that integrates influences from several ecological systems (e.g., referring to Bronfenbrenner, 1979) as well as elements of various research perspectives including evolutionary and ecological approaches, or gene-environment interactions (Malamuth & Malamuth, 1999; Malamuth et al., 1991).

The authors of the Confluence Model have proven the applicability of their explanatory framework of sexual aggression against women in both cross-sectional and longitudinal studies including different samples of young adult men and somewhat different conceptualizations of according theoretical constructs (Malamuth et al., 1995; Malamuth et al., 1991). Other researchers have generally replicated (elements of) the Confluence Model in adolescent student and JSO samples; however, these studies have emphasized that different ACEs, e.g., physical and sexual abuse, may have unique, shared, and cumulative impacts on the development of sexual aggression toward coeval females (e.g., Bramsen et al., 2014; Casey et al., 2009; Johnson & Knight, 2000).

Furthermore, Hunter, Figueredo, and Malamuth (2010) relied on data from 256 JSOs with sexual contact offenses to adapt the Confluence Model for the explanation of sexual aggression of adolescents perpetrated against children. They propose that ACEs may impair psychosocial functioning, which again mediates (a) a *social deviance path* describing the engagement in nonsexual crime as a consequence of negative attitudes and psychopathic features; and (b) a *sexual deviance path* describing the engagement in sexual crime against male children as a consequence of hostile masculinity and sexual interest in children. The elements of these two parts are as well suggested to be dependent on experienced ACEs, e.g., through social learning (e.g., Bandura, 1973, 1978).

Knight and Sims-Knight (2003) have refined the Confluence Model and included three instead of two paths that start with the experiences of physical, verbal, and sexual abuse and eventually converge to forward sexual aggression. More specifically, the three paths are based on the assumptions that (a) physical and/or verbal abuse promotes symptoms of callous-unemotional personality traits; (b) physical and/or verbal abuse promotes antisocial and aggressive behavior tendencies through modeling effects; and (c) sexual abuse promotes increased occupation with sexuality and eventually coercive sexual fantasies. Figure 3 illus-

trates how the convergence of these pathways may lead to sexual aggression, most likely through aggressive sexual fantasies. Based on data from adult community, adult sex offender, and JSO samples, the authors concluded that this revised model appeared more appropriate to explain sexual aggression against coeval females than the original two-path Confluence Model (Knight & Sims-Knight, 2003, 2005). Daversa and Knight (2007) have further highlighted the interaction of ACEs and deviant personality traits for the development of adolescents' sexual aggression against children defining four distinct pathways (see Figure 4).

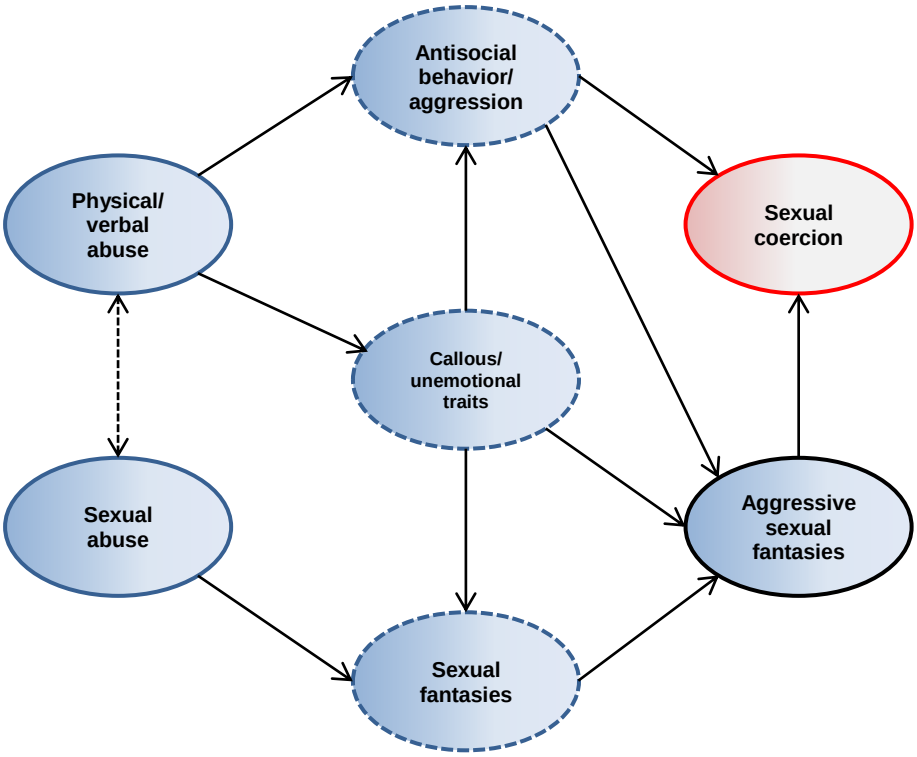

Figure 3. Three-path developmental model for sexual coercion against females. Adj. from Knight and Sims-Knight (2003, p. 75).

Steady vulnerability models

Multiple approaches have been formulated that associate ACEs with poor attachment, deficient intimacy needs, and the development of an enduring vulnerability for stress that may enhance the risk of sexual offending. An early example is Marshall's (1989) assumption that disruptive relationships with parents will accompany poor parental attachment and lack of intimacy, which prevents the subsequent development of intimate attachments to others, and eventually leads to a state of emotional loneliness which again sets the individual at risk

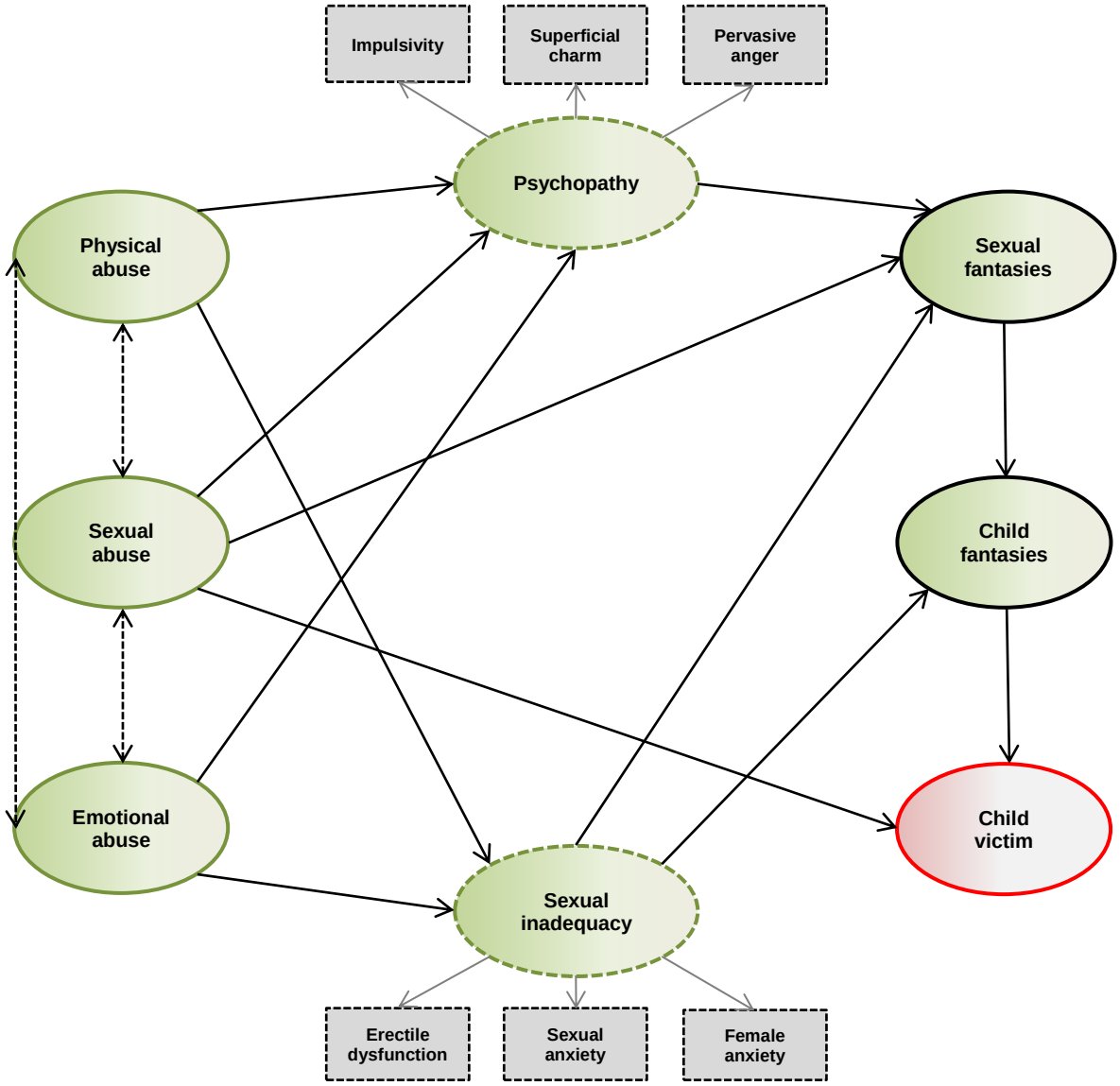

Figure 4. Four-path developmental model for sexual coercion against children. Adj. from Daversa and Knight (2007, p. 1322).

for antisocial and/or problematic sexual behaviors. According to Marshall (1989), the perpetration of sexual aggression is particularly likely when the intimacy-deprived child additionally experiences sexual abuse, as sexuality may be linked to intimacy and may be potentially considered as a functional means to meet intimacy needs.

Marshall and Barbaree (1990) and Marshall (1993) proposed a theory of sexual offending that embedded the link between ACEs, attachment, intimacy deficits, and risk of sexual aggression within a biological and sociocultural framework. They argue that hormonal changes during puberty intensify the development of both sexual and aggressive behavior. However, (adolescent) victims of intra-familial ACEs may lack the ability to properly distin-

guish sexuality and aggression. Since they have been prevented from shaping secure attachments and failed to acquire adequate social skills to engage in intimate relationships with others due to abusive family experiences, they are additionally at increased risk of long-term social exclusion and of developing enduring intimacy deficits (accompanied by feelings of insufficiency with regard to masculinity, anger, and antagonistic sociocultural attitudes). Thus, they become particularly vulnerable to committing sexual aggressive acts when confronted with additional stressful experiences. Marshall and Marshall (2000) later stated that the vulnerability resulting from ACEs (including poor self-worth, deficient social skills, and intimacy deficits) may lead to the usage of sexual behaviors as coping strategies against stress. Sexual abuse perpetration is suggested to be highly probable when the individual repeatedly associates deviant sexual fantasies (e.g., excessive control over and humiliation of sexual partners) with sexual arousal (e.g., during masturbation).

Beech and Ward (e.g., Beech & Ward, 2004; Ward & Beech, 2006, 2016) formulated a theory of sexual offending built on several previously proposed approaches (e.g., Marshall & Barbaree, 1990; see above) as well as empirical findings. The core assumption of the theory stresses that ACEs promote a vulnerability to sexual offending through poor attachment, lack of social skills to establish adequate (intimate) social relationships, and distorted attitudes toward oneself (e.g., concerning feelings of masculinity or sexual identity) and others. Individuals may engage in sexual offending in order to satisfy sexual desire meeting this vulnerability.

Moreover, experienced rejection from coeval intimate partners may increase the risk of perpetrating against children. Ward and Beech (2006, 2016) highlight the consideration of interaction effects between genetic influences, neurological/neuropsychological development as well as sociocultural and personal features in their theory (see Figure 5). It is assumed that sexual offending results from psychological dysfunction that promotes acute disadvantageous states such as socio-emotional problems and distorted cognition. Thereby, psychological dysfunction is based on inheritable factors (influencing brain development) as well as adverse learning experiences. These learning experiences are represented as the dynamic product of distal (i.e., vulnerability) and proximal (i.e., reaction to current triggers) factors based on sociocultural and personal dispositions.

Thornton and D'Orazio (2016) proposed a risk model of sexual (re)offending based on Beech and Ward's assumptions (e.g., Beech & Ward, 2004) as well as elements of behavioral theories such as the theory of planned behavior (e.g., Ajzen, 1985). According to Thornton and D'Orazio (2016), the cognitive and behavioral associates of the abovementioned intimacy

deficit may be conceptualized as a long-term vulnerability (LTV) representing "a way of functioning that has become sufficiently persistent and generalized" (p. 676). LTV may not be consistently noticeable but rather remain covered until it is triggered by specific, current circumstances (e.g., acute stress). Once triggered, LTV may impact current behavioral intentions (e.g., pursuit of intimacy needs) toward sexually delinquent behavior, especially when antisocial attitudes and behavioral skills excel prosocial orientations and internal or external protective factors (e.g., self-control or social support).

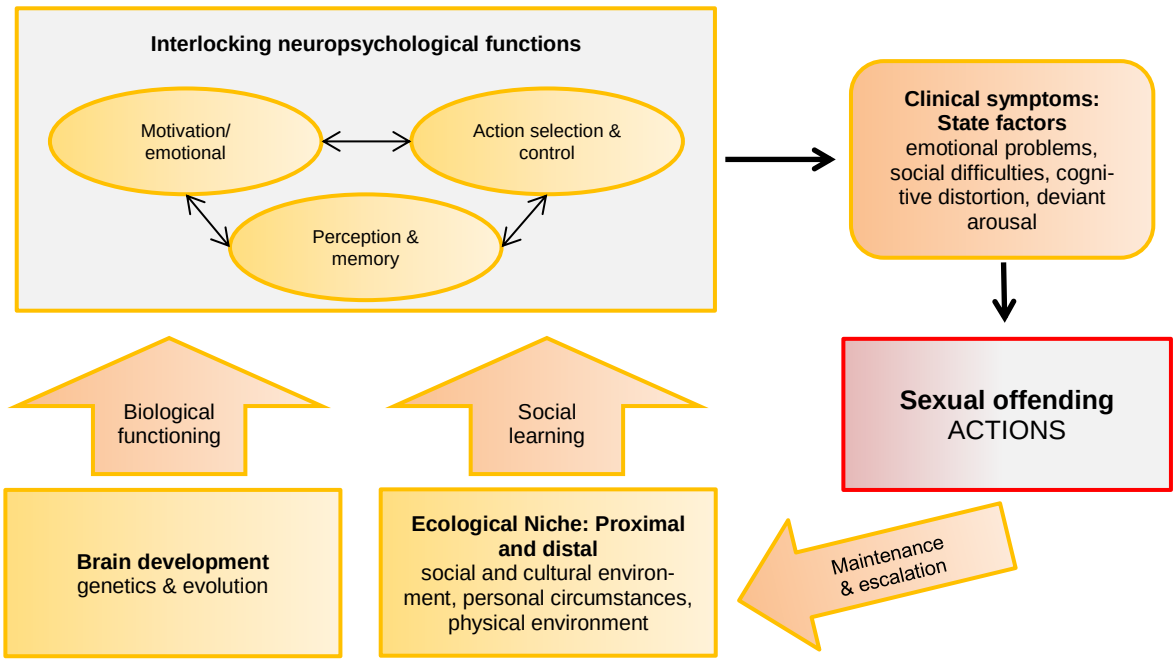

Figure 5. Unified theory of sexual offending. Adj. from Ward and Beech (2006, p. 51).

TOPA Model

The Trauma Outcome Process Assessment (TOPA) Model (Rasmussen, 2012a, 2012b; Rasmussen, J. E. Burton, & Christopherson, 1992) displays an etiological framework for sexual aggression that responds to potential shortcomings of traditional victim-to-victimizer approaches (e.g., G. Ryan et al., 1987) such as the fact that most victims of sexual abuse do not become perpetrators of sexual abuse, or the exclusion of potential external behavioral influences (Rasmussen, 2012b). In short, TOPA assumes that reactions to ACEs are versatile depending on established predispositions and current (positive or negative) circumstances (Rasmussen, 2013). More specifically, victims may engage in three different behavioral pathways in the aftermath of ACEs: (a) *self-victimization*, which includes increasing

negative self-perceptions that are channeled through self-oriented destructive behaviors such as self-harm, eating disorders, substance abuse, or suicidal tendency; (b) *abuse*, which includes channeling negative emotional states and attitudes through affronting others, for example by blaming them or engaging in aggressive/abuse behaviors against them; and (c) *recovery and integration*, including the recognition of the dynamics between experienced adversity and current triggers, which enables the victim to appropriately process his/her experiences and engage in adaptive coping strategies (Rasmussen, 2013). Whether an individual will follow one of the two maladaptive pathways or the adaptive recovery and integration pathway is presumed to be dependent (a) on internal and external predispositions, such as genetic influences and neurological/neuropsychological functioning as well as family and/or cultural influences, respectively; and (b) on the degree of the impact that ACEs have on self-awareness through impairments of self-perception and regulation as well as neurobiological processes (Rasmussen, 2012b). Figure 6 illustrates the basic assumptions of the TOPA Model. Although not specifically outlining sexual offending as potential consequence of ACEs, Borja and Callahan (2009) and Callahan, Borja, Herbert, Maxwell, and Ruggero (2013) have supported the applicability of the TOPA Model with regard to psychological adjustment after ACE experiences.

Conclusion

In conclusion, an overall theory that incorporates the great variety of possible risk factors for sexual offending is yet missing (Murphy, Page, & Hoberman, 2016). However, the previous paragraphs delivered an overview over some existing models that trace sexual offending back to ACEs and underscore that ACEs may influence the risk of sexual offending via diverse pathways (Murphy et al., 2016). Not only sexual victimization, but a considerable number of ACEs, and more specifically their particular combinational patterns, may contribute to the development of sexual aggression (Rasmussen, 2013). Although potential commonalities and differences among pertinent models as well as their empirical support (if available) were illustrated in the previous paragraphs, it was beyond the scope of the present thesis, however, to describe each theory in detail, systematically compare different models, or even evaluate or rank them against each other (for more detailed debates about specific theories see, e.g, Beech & Ward, 2004; Seto & Lalumière, 2010).

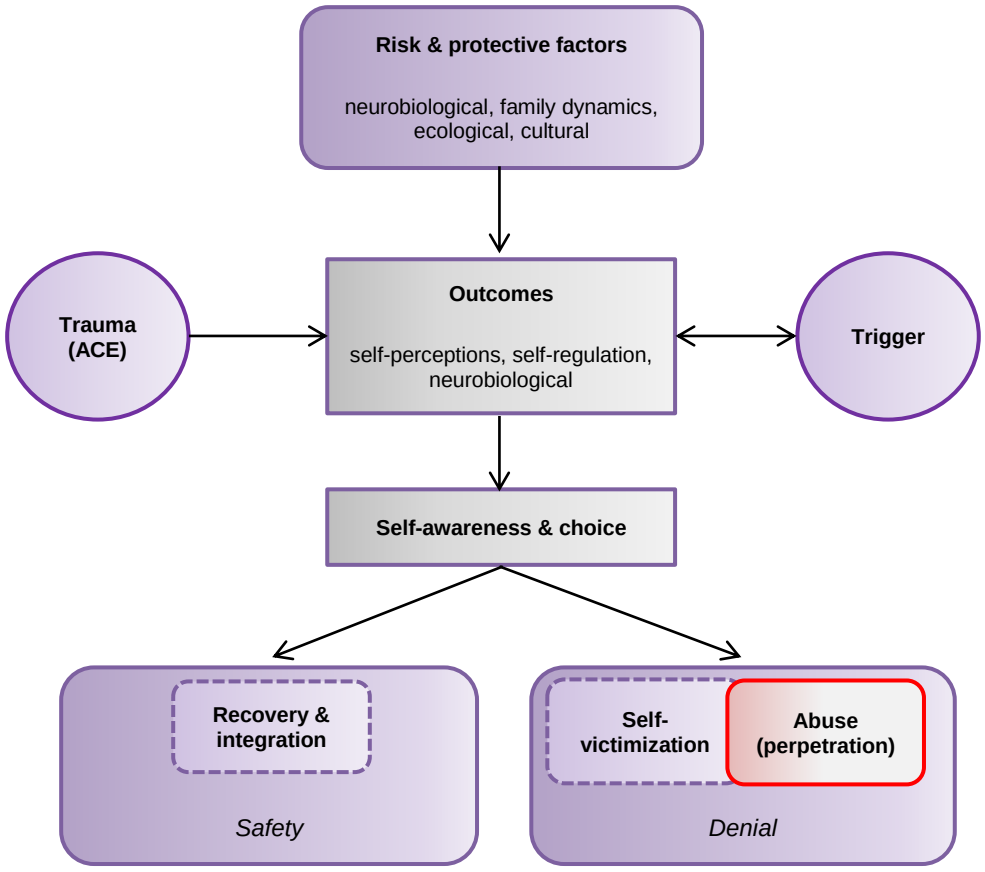

Figure 6. TOPA Model. Adj. from Rasmussen (2012a, p. 65).

ACEs as risk factors for reoffending in JSOs

A major challenge for professionals working with JSOs is the identification of risk factors that set JSOs at increased risk of reoffending. Adequate risk assessment is essential to (a) prevent society from future danger by JSOs; (b) assign JSOs to appropriate treatment conditions; and (c) protect JSOs from stigmatization and failing reintegration (Miccio-Fonseca & Rasmussen, 2011; Parks & Bard, 2006; Prentky et al., 2010; Rasmussen, 2013).

Criminal persistence in JSOs

In contrast to common beliefs (e.g., Chaffin, 2008), research has shown that most JSOs do not repeatedly engage in sexually offending behavior, and that their risk of becoming adult sexual offenders is quite low (Lussier, 2017; E. P. Ryan, 2016). In fact, the majority of JSOs may rather engage in general delinquent careers than specialize in sexual offending (Lussier, 2017). Reviewing 106 studies conducted between 1938 and 2014 with a total of 33,785 JSOs, Caldwell (2016) reported an average weighted base rate of 4.9% for sexual

reoffending within a mean observation period of approximately five years. Results further indicated a major decline in sexual recidivism regarding earlier studies (i.e., 10.3% for studies published between 1980 and 1995) and more recent publications (i.e., 2.75% for studies published between 2000 and 2015). In a previous meta-analysis of 63 studies, Caldwell (2010) found mean JSO recidivism rates as high as 7.1% for sexual offenses but 43.4% for general delinquency. Equally, Aebi, Plattner, Steinhausen, and Bessler (2011) stated much higher reoffending rates for general recidivism (44.8%) compared to sexual recidivism (3.1%) in a consecutive JSO sample from Switzerland.

However, the courses of JSOs' crime involvements are not clear. With regard to the criminal careers of general justice-involved youth, Moffitt's (1993) dual taxonomy presumes that juvenile delinquents may follow two longitudinal patterns. The majority of them will only commit crimes during the time period of adolescence, most likely motivated by the urge to show self-assertion and demarcation from their caregivers. These adolescents may rather commit offenses that represent autonomy and protest against given rules, such as property damage or thievery, in situations that appear promising to achieve certain rewards. However, a minority of juvenile offenders may show enduring crime involvement, most likely based on severe personal and socio-emotional impairments not least attributable to disadvantageous developmental conditions such as ACEs. These adolescents may rather commit more versatile offenses including crime with elevated severity that involves harming others. However, contemporary research has questioned the applicability of Moffitt's (1993) dual taxonomy to JSOs. Lussier, Van Den Berg, Bijleveld, and Hendriks (2012), e.g., examined the criminal trajectories of 498 Dutch JSOs and found that longitudinal offense patterns were much more diverse than the dual taxonomy approach would suggest, e.g., with regard to the maintenance and the transitions between sexual and nonsexual offending from adolescence into adulthood.

Associations of ACEs with juvenile criminal persistence

Recent research has proposed that criminal recidivism of JSOs may be best explained by "a combination of developmental, social, and criminological factors" (Carpentier & Proulx, 2011, p. 443). Reviewing studies published between 1980 and 2002, Worling and Långström (2003) categorized a number of variables commonly used in risk assessment for sexual recidivism in JSOs according to their empirical foundations as (a) *supported* (predictive value proven by meta-analysis and/or at least two independent follow-up studies); (b) *promising* (predictive value proven by at least one study); (c) *possible* (contradictory findings or never evaluated in follow-up studies with JSOs); and (d) *unlikely* (evidence rather against this risk factor). Supported risk factors included, e.g., sexual deviancy, former sexual delin-

quency, various/stranger victims, or social isolation. Promising risk factors included, e.g., sexual coercive attitudes and troubled relationships with parents. Possible risk factors included, e.g., impulsivity, antisocial tendencies, and a stressful family context. Unlikely risk factors included, e.g., deficient empathy for the victim and, rather surprisingly, the offenders' own experiences of sexual victimization (despite the emphasis of sexual victimization as risk factor for the initiation of sexually abusive behaviors; e.g., Seto & Lalumière, 2010). While some of these categorizations were supported by the following research, e.g., victim characteristics, deviant sexual phantasies, and antisocial tendencies (Hanson & Morton-Bourgon, 2005; McCann & Lussier, 2008), others remained questionable. For example, some studies have found sexual victimization to be associated with sexual reoffending in JSOs (Carpentier & Proulx, 2011; Mallie, Viljoen, Mordell, Spice, & Roesch, 2011).

However, despite the emphasis on ACEs in the etiology of sexual offending (see above), the role of ACEs with regard to the maintenance of sexual and nonsexual crime in JSOs is less well examined. Although some of the abovementioned models assign importance to ACEs with regard to enduring crime involvement (e.g., those assuming ACEs to contribute to a steady vulnerability that may increase the risk of [repeated] crime), empirical evidence on the relations between ACEs and criminal recidivism in JSOs is rather inconclusive. Besides sexual victimization, Carpentier and Proulx (2011) found parental refusal to be positively related to sexual reoffending in a sample of 351 JSOs from Canada. In contrast, childhood physical abuse appeared not to be related to sexual recidivism of JSOs (Mallie et al., 2011). Hanson and Morton-Bourgon (2005) conducted a meta-analysis including 82 studies and concluded that none of the examined ACEs (e.g., sexual and physical abuse as well as neglect) were associated with sexual re-offenses in adults and/or adolescents who had sexually offended.

However, JSOs have been found to show similar rates of sexual and nonsexual recidivism compared to juvenile delinquents without sexual offenses, and predictors of sexual and nonsexual recidivism appeared to be comparable between these groups (Caldwell, 2007; E. P. Ryan, 2016). Thus, research on the importance of ACEs for the recidivism risk of JSOs may be inspired by findings on risk prediction in general offender samples. A recent study on about 10,000 male adolescent general offenders found experiences of parental neglect to be predictive of general recidivism and experiences of parental physical abuse to be predictive of violent recidivism, over and above the effects of several dynamic risk factors like school and relationship problems, or substance abuse (van der Put & De Ruiter, 2016). Furthermore, neglectful parenting has been associated with short-term persistence of severe delinquency in

adolescence when controlling for prior delinquency and demographics (Hoeve et al., 2008). Emotional neglect, not physical neglect, was also predictive of criminal recidivism in a juvenile offender sample (Kingree et al., 2003). Baglivio et al. (2015) as well as Fox et al. (2015) found an increasing number of ACEs positively related to the chronicity of delinquency in juveniles offenders. Furthermore, elevated cumulative scores were associated with shorter time-periods until the first re-offense (Wolff, Baglivio, & Piquero, 2017). Taking a closer look at neglectful experiences of about 20,000 juvenile delinquents, J. P. Ryan et al. (2013) found hints that the timing of this type of ACEs may matter, as findings indicated that neglect that was enduring into adolescence was positively associated with the criminal recidivism in general and with shorter time-intervals until the first re-offense.

Risk assessment instruments for JSOs

Despite the major importance given to the identification of JSOs at risk of criminal recidivism (e.g., Miccio-Fonseca & Rasmussen, 2011; Parks & Bard, 2006; Prentky et al., 2010; Rasmussen, 2013), the number of risk assessment instruments applicable to JSOs is limited and conclusive support of their predictive values is missing (e.g., Hempel, Buck, Cima, & van Marle, 2013; Murphy et al., 2016). The Juvenile Sex Offender Assessment Protocol II (J-SOAP II; Prentky & Righthand, 2003) and the Estimate of Risk of Adolescent Sexual Offense Recidivism (ERASOR; Worling & Curwen, 2001) have been considered as those risk assessment instruments most often implemented in research and practice settings that include JSOs (Hempel et al., 2013; Miccio-Fonseca, 2016; Rettenberger, Klein, Martin, & Briken, 2014; E. P. Ryan, 2016). However, whereas their developers usually found empirical support for their applicability in risk prediction (Prentky et al., 2010; Righthand et al., 2005; Worling, 2004; Worling, Bookalam, & Litteljohn, 2012; Worling & Langton, 2015), other researchers have passed some criticism on their validities (e.g., Caldwell et al., 2008; Martinez, Rosenfeld, Cruise, & Martin, 2015; Quenzer & Dahle, 2010; Viljoen, Elkovitch, Scalora, & Ullman, 2009; Viljoen et al., 2008; Wijetunga, Martinez, Rosenfeld, & Cruise, 2016).

Moreover, the authors of the recently published Violence Risk Appraisal Guide-Revised (VRAG-R; G. T. Harris, Rice, Quinsey, & Cormier, 2015; Rice, Harris, & Lang, 2013) have stated that it may not only be applicable to adult but also to juvenile offender samples, although independent research to support this claim is yet missing. There has also been an ongoing debate on the usefulness and validity of different risk assessment procedures like unstructured clinical judgment (UCJ; i.e., risk estimation based on clinical impression), actuarial approaches (i.e., risk estimation based on the sum of weighted empirical risk fac-

tors), and structured professional judgment (SPJ; i.e., risk estimation based on clinical impression that is guided by empirical risk factors) in adult and juvenile offender samples (e.g., Brown & Singh, 2014; Hanson & Morton-Bourgon, 2009; Hempel et al., 2013)

Although, as outlined above, ACEs have been related to criminal recidivism in JSOs and other juvenile offenders, and at least some ACEs are included in the abovementioned risk assessment instruments, little research has focused on the explicit role of ACEs in risk prediction. A considerable exception is a recent study by Fox et al. (2015) who emphasized the promising applicability of a cumulative ACE score for the identification of prospective juvenile delinquents.

4. Limitations of Previous Research

Although there is a vast body of research on juvenile sexual offending with regard to its precursors, courses, and consequences, and despite the considerable interest in the role of ACEs in these developments, the pertinent empirical basis is limited by a wide range of qualifications. This is due to specific study features but also to the nature of the phenomenon of juvenile sexual offending that is characterized by limited sample sizes and the great heterogeneity of JSOs, e.g., regarding offense characteristics and ACE burden.

4.1 Study procedures and prevalence rates

Most studies on juvenile sexual offending have included rather small JSO samples, which poses a particular problem for the investigation of risk factors and risk prediction of persistent crime, i.e., due to the low prevalence of sexual reoffending among JSOs (Aebi et al., 2011; Fanniff & Letourneau, 2012; Hempel et al., 2013; Lussier, 2017; Miccio-Fonseca, 2016; Parks & Bard, 2006; Wijetunga et al., 2016; Worling et al., 2012). Concerning recidivism rates, studies that have only relied on officially registered crime data may have failed to include the considerable number of offenses that are perpetrated in the dark field; thus, studies may benefit from including non-registered offenses as well (e.g., Maier et al., 2013; Wolff & Baglivio, 2016). The deduction of conclusive findings has been further complicated by the fact that studies have included JSOs with very diverse recidivism periods. Considering the potential changes of risk factors in the courses of the adolescents' developments, studies should examine JSOs with comparable recidivism periods, and best include different recidivism periods to examine longitudinal differences (e.g., Fanniff & Letourneau, 2012; Hempel et al., 2013; Miccio-Fonseca, 2016; Ralston & Epperson, 2013; Schlank, Matheny, & Schilling, 2016; Viljoen, Mordell, & Beneteau, 2012). Moreover, the comparability of different studies is hindered when findings are based on JSOs from different sampling conditions, e.g., JSOs from correctional facilities (e.g., Martinez et al., 2015) versus JSOs from consecu-

tive samples (e.g., Aebi et al., 2011). Including consecutive samples appears beneficial over selective JSO samples, however, because those samples may include a wider range of JSOs with regard to their personal and offense characteristics (e.g., Aebi et al., 2011).

With respect to the examination of ACEs, findings from previous studies that were only based on self-reports have been challenged regarding their validities, especially in offender samples (e.g., Hardt & Rutter, 2004; Seto & Lalumière, 2010). Furthermore, studies that have only investigated single ACEs may have failed to consider the effects of their coexistence (e.g., Charak & Koot, 2015). A common approach to consider the influence of multiple ACEs is to create a cumulative sum score as done in the original ACE study (Felitti et al., 1998). However, only considering the sum of different ACEs is deficient as ACEs are commonly mutually dependent and the cumulative nature of the ACE score does not respect the actual types of ACEs or the effects of specific ACE patterns (Berzenski & Yates, 2011; Teicher & Samson, 2016).

As outlined above, the varying conceptualization of ACEs across studies additionally hinders the deduction of conclusions for research and practice (e.g., Kalmakis & Chandler, 2014). Lastly, although research has found time-dependent effects of ACEs on general juvenile delinquency and other maladaptive outcomes (e.g., Thornberry et al., 2001), no study has yet investigated potential timing effects of ACEs in the field of juvenile sexual offending.

4.2 The heterogeneity of JSOs

A major factor that complicates universal conclusions about the occurrence, maintenance, and prediction of crime in JSOs is their heterogeneity (e.g., Andrade, Vincent, & Saleh, 2006; Becker & Hicks, 2003; Fanniff & Kimonis, 2014; Van Wijk et al., 2006). Not only may JSOs differ widely with regard to their experiences of ACEs (see above), but they are also heterogeneous on personal features as well as on offense and victim characteristics (Aebi, Vogt, Plattner, Steinhausen, & Bessler, 2012; Bijleveld & Hendriks, 2003; Gunby & Woodhams, 2010; Hunter, Hazelwood, & Slesinger, 2000; Miccio-Fonseca & Rasmussen, 2009; Veneziano & Veneziano, 2002). Therefore, comparisons of ACEs between JSOs on the whole and adolescent nonsexual offenders may fall short on detecting subtle differences related to specific JSO-subtypes (Fanniff & Kolko, 2012; Van Wijk et al., 2006).

Various studies have compared theoretically derived subtypes of JSOs with regard to offense characteristics and ACEs. As further described in Study 3 of the present thesis (Barra, Mokros, Landolt, Bessler, & Aebi, 2017), most prominently, JSO with child victims (JSO-Cs) were contrasted to JSO with adolescent or adult victims (JSO-As; e.g., Leroux, Pullman, Motayne, & Seto, 2016). For instance, compared to JSO-As, JSO-Cs have been found to less

often conduct offenses in groups, to more likely perpetrate against male victims, to be of younger age at the onset of their offenses, to less often show antisocial behavior problems, and to be more likely to have been exposed to ACEs (Hart-Kerkhoffs, Doreleijers, Jansen, van Wijk, & Bullens, 2009; Hendriks & Bijleveld, 2004; Kjellgren, Wassberg, Carlberg, Långström, & Göran Svedin, 2006; Skubic Kemper & Kistner, 2010). More specifically, JSO-Cs were - compared to other JSOs - more frequently burdened with sexual abuse (Aebi et al., 2012; Hart-Kerkhoffs et al., 2009; Van Wijk et al., 2006) and peer bullying (Gunby & Woodhams, 2010; Hendriks & Bijleveld, 2004). Gunby and Woodhams (2010) further found that JSO-Cs had more often experienced caregiver changes, whereas JSO-As were more frequently burdened with witnessing intra-familial violence, with having criminal family members, and with family financial deprivation. In addition, JSO-As have been characterized by lacks of parental supervision (Fanniff & Kolko, 2012). Concerning criminal persistence, JSO-Cs were found to be at lower risk of general criminal recidivism compared to JSO-Cs, whereas subgroups have not differed with regard to sexual reoffending (Fanniff & Kolko, 2012).

In addition, JSOs have been distinguished according to whether they have engaged in other, nonsexual crime (JSO+) or not (JSO-; e.g., Aebi et al., 2012). For example, JSO who had both committed sexual and other violent offenses appeared to be particularly burdened with behavioral peculiarities as well as family dysfunction and ACEs (Murphy et al., 2016). Furthermore, JSO+ were more likely to engage in general reoffending than JSO-, but did not differ to JSO- with regard to sexual recidivism (e.g., Chu & Thomas, 2010).

Differences have also been found between JSOs who perpetrated on their own compared to JSOs who perpetrated in groups. Whereas solo offenders were more likely to perpetrate against children, group offenders were more likely to perpetrate against coeval or older victims (e.g., Höing, Jonker, & van Berlo, 2010; Kjellgren et al., 2006). Concerning ACEs, solo offenders appeared to be more frequently burdened with experiences of sexual victimization and peer bullying than group offenders (e.g., Bijleveld & Hendriks, 2003; Höing et al., 2010). Group offending (rather than solo offending) has been related to ongoing criminality (Hart-Kerkhoffs et al., 2009).

In sum, subtyping approaches may be preferable over studies that consider JSOs as a homogeneous group in order to derive conclusions about the nature of juvenile sexually offending (e.g., Murphy et al., 2016). However, assignments of JSOs to a priori defined (theory-driven) subtypes have been criticized due to the potential overlaps among the characteristics of these subtypes (e.g., JSO-C & solo-offender subtypes), and rather dimensional, empirical subtyping approaches have been considered as beneficial (e.g., Aebi et al., 2012).

B. EMPIRICAL STUDIES

1. Research Questions

Based on the theoretical foundations and the limitations of current research in the field of juvenile sexual delinquency outlined in Chapter A, the four empirical studies conducted in the framework of the present thesis aimed at investigating the influential role of ACEs on the occurrence, maintenance, and prediction of adolescent sexual offending while taking the heterogeneity of JSOs into account. More specifically, the following research questions were addressed:

(a) Can distinct empirically derived JSO-subtypes based on individual ACE patterns explain the heterogeneity of JSOs with regard to offense and victim characteristics of the sexual index offense?

(b) Can distinct empirically derived JSO-subtypes based on time-dependent individual ACE patterns explain the heterogeneity of JSOs with regard to sexual and nonsexual criminal recidivism?

(c) Can distinct empirically derived JSO-subtypes based on individual offense patterns explain the heterogeneity of JSOs with regard to psychosocial adversity, ACEs as well as sexual and nonsexual criminal recidivism?

(d) Can current risk assessment instruments accurately predict whether a JSO will reoffend, and may the heterogeneity of JSOs with regard to offense characteristics and ACEs impact these predictions?

2. General Methods

2.1 Procedures

In order to answer the abovementioned research questions, a comprehensive JSO sample was examined in Switzerland. Data assessment took place in the framework of an ongoing study on the evaluation of a specific treatment program for JSOs (Therapieprogramm für ein angemessenes Sexualverhalten [ThePaS]; e.g., Bessler, Manetsch, & Best, 2011), conducted by the Center for Child and Adolescent Forensic Psychiatry and Psychotherapy, part of the Department of Forensic Psychiatry of the University Hospital of Psychiatry Zurich, and funded by the Swiss Federal Office of Justice and the Juvenile Prosecution Office of the Canton Zurich. Data were collected by a forensic psychologist, a doctoral student of forensic psychology (the author of the present thesis), and a psychology student in the last year of his Master's studies. In the first wave of data collection between February and December 2015, the judicial and medical files of all juveniles sentenced for a sexual offense

between January 1st 2007 and September 30th 2014 (in the following considered as *index offense*) were analyzed in 14 cantons (states) of the German speaking part of Switzerland (see Figure 7). Three cantonal juvenile justice departments had refused participation due to canton-specific privacy policies or staff shortage. Two cantonal juvenile justice departments stated no JSO cases within the considered time period. Files included, for instance, police and court reports, psychiatric/psychological expert opinions, therapeutic documentations, reports by schools or other educational youth institutions, and probation reports.

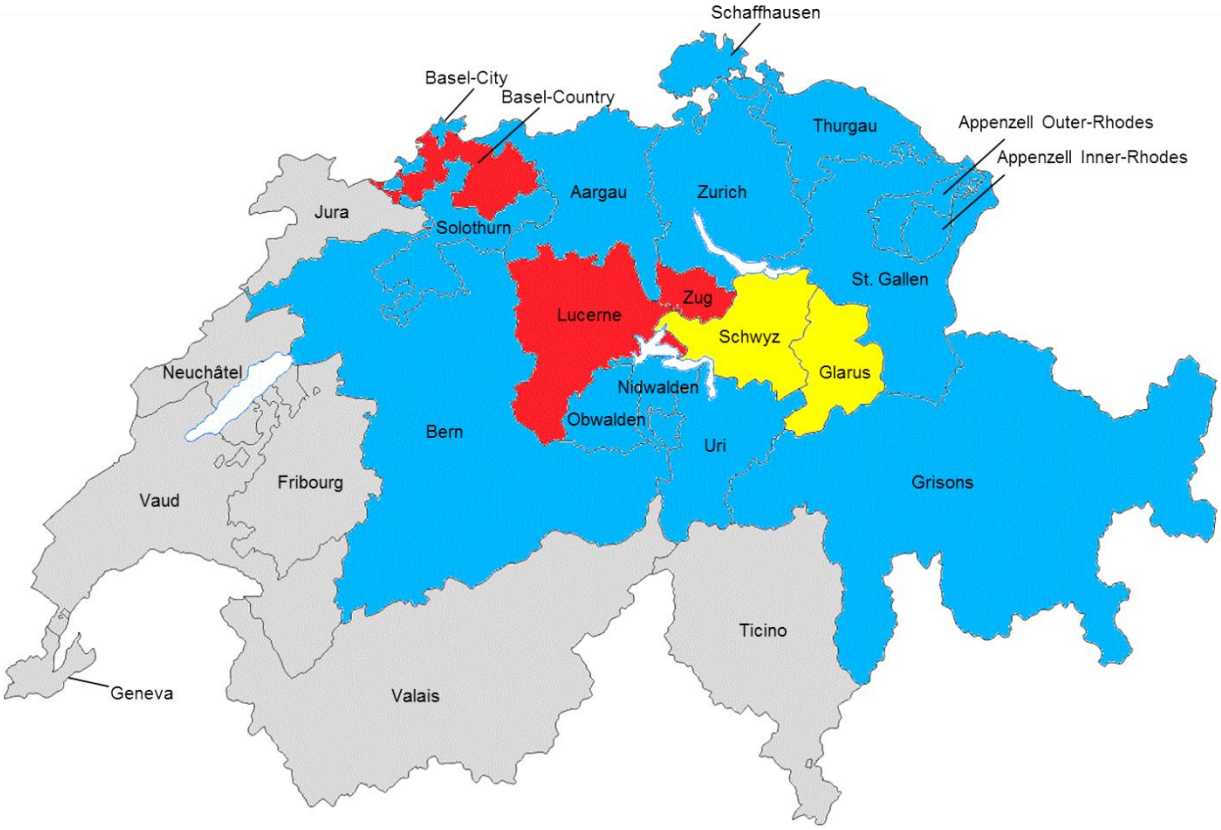

Figure 7. Cantons involved in data collection (blue). Cantons that had refused participation are colored red and cantons that had stated no JSO cases are colored yellow. Grey areas represent French or Italian speaking parts of Switzerland. Adj. from http://www.d-maps.com.

In order to analyze interrater agreement, 30 case files were independently double-rated by the forensic psychologist and the author of the present thesis. The selection of these files was based on a stratified randomization procedure, in which the abovementioned Master's student randomly assigned case files to the two raters under consideration of file content (the inclusion [n = 20] and lack [n =10] of a psychiatric/psychological expert opinion) and of the residential area of the JSO (rural = areas from the Canton Thurgau with primarily less

than 10,000 inhabitants; urban = areas from the city of Zurich with primarily more than 10,000 inhabitants).

In the second wave of data collection in June/July 2016 and February 2017, official criminal records of all JSOs identified in the first wave of data collection were analyzed. Criminal records were provided by the Swiss Federal Office of Justice and the Swiss Federal Statistical Office. Interrater agreement was again examined by comparing the coding of two independent raters with regard to 30 randomly selected (not stratified) cases.

Study procedures were approved by the ethics committees of Zurich and north-west/central Switzerland (EKNZ; lead ethics committee: Zurich, EC-No. 2010-0483) as well as all of the participating juvenile justice departments.

2.2 Sample

The total sample contained 687 JSOs aged between 8.50 and 18.50 years (M = 14.47 years, SD = 1.95 years) at the first incident of their sexual index offense. Among those JSOs, 98.0% (n = 673) were male and 2.0% (n = 14) were female adolescents. Sexual offenses ranged from sexual harassment to rape (see Table 1 for an overview of committed offense categories in the total sample according to the Swiss penal code). Because the small proportion of female JSOs would have impeded reliable statistical analyses, the four empirical studies conducted within the present thesis only relied on data of the male JSOs. Moreover, depending on the research questions addressed, different subsamples were used across studies, e.g., due to the availability of biographical data or restrictions of applicability given by included risk assessment instruments. Subsample compositions are described in detail in the respective studies.

2.3 Measures

Systematic code book

Prior to data assessment, the author of the present thesis has contributed to the development of a systematic code book (Aebi, Bessler, & Barra, 2014)[4]. The code book represents an advancement of a documentation system used in previous studies (Aebi, 2009; Aebi et al., 2012) that had been based on the Forensic Psychiatric Documentation System (Nedopil, Grassl, & Mende, 1986). In total, the 50-page document contains 17 sections for the detailed assessment of (a) basic administrative as well as personal and family-related demographic data; (b) details of the sexual index offense; (c) specifications of prior crime histories; (d) aspects of a JSO's general and sexual development (including intra-and extra-familial ACEs);

[4] The comprehensive code book is not attached to the present thesis for lack of space but may be requested by the author.

(e) criteria for the evaluation of the quality of psychiatric/psychological expert opinions; (f) type and course of court decisions/measures; (g) risk of reoffending; and (h) actual rates of reoffending. Including re-offenses reported in the case files that may not have led to criminal charges in addition to the reoffending rates recorded in official registries allowed for the approximation toward the dark figure of crime (e.g., Maier et al., 2013).

The four empirical studies will each describe accordant variables of interest in more detail. However, because the current thesis places emphasis on the role of ACEs, the following paragraphs will shortly outline the present operationalization of ACEs.

Table 1

Descriptions and Distributions of Sexual Offenses According to the Swiss Penal Code in the Total Sample of Male and Female JSOs

Article (number in Swiss penal code)	Description	Male (N = 673)		Female (N = 14)	
		n	%	*n*	%
187	Sexual offense against a child (i.e., victim younger than 12 years and at least 3 years younger than the perpetrator)	246	36.6	4	28.6
188	Sexual offense within a relationship of dependence	1	0.1	0	0.0
189	Sexual coercion (i.e., forcing victim into sexual activities; includes digital and/or anal penetration)	245	36.4	0	0.0
190	Rape (i.e., forcing a female victim into vaginal intercourse)	44	6.5	0	0.0
191	Performance of sexual activities with a victim who is known to the perpetrator as not judicious or unable to offer resistance	31	4.6	1	7.1
194	Exhibitionism	14	2.1	0	0.0
197	Pornography (i.e., consumption, production, and distribution of illegal pornographic material [including children, animals, or violence], or provision of pornographic material to a person below the age of 16 years)	34	5.1	3	21.4
198	Sexual harassment (i.e., provoking distress in victim by nonconsensual performance of sexual activities in front of victim, touching the victim with sexual intention, or offending the victim by sexual speech)	198	29.4	8	57.1
200	Increased penalty for committing offenses of any of the above-mentioned categories within a group of offenders	4	0.6	0	0

Note. Total N = 687. No offenses were coded in the present sample with regard to Article 192 (sexual activities with victims in institutional or criminal justice institutions), 193 (sexual offenses against victims in state of emergency), 195 (promotion of prostitution), 196 (sexual activities with minors for money), and 199 (illegal prostitution).

ACEs

ACEs were assessed following the 10 intra- and extra-familial ACE categories introduced in the German version of the Maltreatment and Abuse Chronology of Exposure (MACE) scale (Isele et al., 2014; Teicher & Parigger, 2015; see, e.g., Table 2). Based on the review of a range of instruments for the assessment of ACEs, the MACE scale displays an alternative to the original ACE questionnaire (Dong et al., 2004; Felitti et al., 1998), yet overcoming potential shortcomings such as the confounding of direct experiences "with shared inheritance" (p. 2) in case of intra-familial substance, psychological, and criminal problems (Teicher & Parigger, 2015). On top, it considers ACEs mostly omitted by other ACE scales, such as peer victimization, intraparental violence toward a male caregiver, and violence against siblings (Teicher & Parigger, 2015). By dividing parental psychological abuse into two subtypes (verbal versus nonverbal), the MACE scale meets recent calls to examine different forms of emotional maltreatment in more detail (Armour, Elklit, & Christoffersen, 2014; Paul & Eckenrode, 2015). The MACE scale was originally constructed as a self-rating and/or interview instrument (Isele et al., 2014; Teicher & Parigger, 2015). Each of the 10 ACE categories is reflected by a specific subscale that consists of several items that describe events corresponding to the overall ACE category represented in the subscale. The occurrence of an event described by each item is coded dichotomously. An ACE category/subscale is considered fulfilled when the sum of its affirmed items exceeds a certain cut-off value. By summing up the number of fulfilled subscales, a cumulative score can be built as an index of the variety of ACEs similar to the original ACE score (Felitti et al., 1998).

Since the present thesis relied on data from an extensive case file analysis, the given data may not meet the accuracy and differentiation that self-reported data may offer. Therefore, the item-dependent cut-off approach was not used in the present thesis. Instead, an ACE category was considered to be fulfilled when there was information in the case files pointing to the overall occurrence of respective experiences as indicated by at least one according item.

To code whether a JSO himself had been a victim of sexually abusive behavior, further information from the Child Sexual Abuse Questionnaire (CSAQ; Mohler-Kuo et al., 2014) was used. This approach appeared beneficial to include a wider range of experiences of sexual victimization because besides attempted and performed physical sexual assaults (e.g., forced touching, forced oral, vaginal, and/or anal penetration), the CSAQ also covers non-contact sexual victimization, including harassment by electronic means (e.g., in chat-rooms, via cell-phone, or via e-mail) which displays a growing type of sexually abusive behavior

among adolescents (e.g., Mohler-Kuo et al., 2014). Similar to the MACE, the 15 items from the CSAQ were dichotomously rated as present or not present. No distinction was made in the present thesis between attempted and conducted sexual victimization. An overall ACE category of sexual victimization was considered fulfilled when any form of sexual victimization according to CSAQ or MACE items was reported in the case files. Finally, a cumulative ACE score was built by adding up the 10 resulting categories of present ACEs.

Both the MACE scale and the CSAQ have been successfully implemented in previous research and findings have pointed to their reliable and valid applicability (Aebi, Landolt, et al., 2015; Isele et al., 2014; Khan et al., 2015; Pechtel et al., 2014; Polcari, Rabi, Bolger, & Teicher, 2014; Radtke et al., 2015; Schalinski et al., 2016; Teicher & Parigger, 2015). Although no estimates of reliability and validity have yet been reported for the use of these instruments in file analyses, the implementation of respective ACE categories has been supported by the interrater agreements found within the present thesis (see empirical studies below for more details).

2.4 Statistical analyses

The four studies conducted in the framework of the present thesis rely on several innovative and state-of-the-art statistical approaches. Meeting the abovementioned shortcomings of theoretically derived JSO-subtypes and of the deficient approach to examine the combined effects of coexisting ACEs by solely building a cumulative score, person-centered analyses were used to empirically derive JSO-subtypes while accounting for the specific patterns of co-occurring ACEs and several offense characteristics. More specifically, Latent Class Analysis (LCA) and Latent Transition Analysis (LTA) were implemented, guided by the comprehensive descriptions of Collins and Lanza (2013) and Nylund (2007). LCA is a person-oriented, statistical approach aiming at identifying mutually exclusive, homogenous latent classes (subtypes) of subjects in heterogeneous samples. LCA proposes each subject's probability of belonging to a latent class (subtype) based on his/her response pattern to categorical indicators. LTA may be considered as an extension of LCA. It is an innovative person-centered statistical method for analyzing time-dependent data. LTA assigns individuals to mutually exclusive classes (subtypes) based on their response patterns at different measurement points, and additionally offers transition probabilities which indicate how individuals change in their affiliations to latent classes (subtypes) over time. LCA and LTA appear of particular benefit for the analyses of the present research questions because they allow disentangling the heterogeneity of JSOs by defining specific empirically derived JSO-subtypes that are not bound by a priori assumptions about their compositions and that consider the fact that

several ACEs and/or offense characteristics are contemporarily existent. Several previous studies have implemented person-oriented approaches in juvenile offender samples. For example, in a study the author of the present thesis has contributed to, LCA was used to identify distinct subtypes of juvenile detainees based on their symptoms patterns of oppositional defiant disorder (Aebi et al., 2016). Just recently, Fox and DeLisi (2017) have applied LCA to derive specific subtypes of male and female JSOs based on certain personality and criminal characteristics.

Furthermore, univariate and multivariate binary logistic, ordinal, and Cox regression analyses were conducted within the present thesis in order to examine the distinct and shared effects of variables and subtypes on certain outcomes. For the investigation of the predictive accuracies of JSO risk assessment tools, Receiver Operator Characteristic (ROC) curves (e.g., Mossman, 1994) were conducted because the resulting Area Under the Curve (AUC) values have been considered to be the "preferred measure of predictive or diagnostic accuracy in forensic psychology and psychiatry" (Rice & Harris, 2005, p. 618).

Interrater agreement was analyzed by calculating Cohen's κ for nominal variables and the intraclass correlation coefficient (*ICC*; two-way random-based approach on single measure, absolute agreement) for metric variables. The categorization of respective values was based on the cut-offs proposed by Landis and Koch (1977) and Fleiss (1981) who stated that interrater agreement is substantial when κ or *ICC* values excess a cut-off of .60.

Finally, a range of further statistical analyses was conducted across the four empirical studies, such as parametric and non-parametric descriptive analyses and group comparisons (e.g., Pearson and Spearman-Rank correlations, χ^2-tests, analyses of variance [ANOVAs], Kruskal-Wallis tests, t-tests, Mann-Whitney-U-tests, and Games-Howell tests).

Whereas LCA and LTA were performed in Mplus version 7.31 (Muthén & Muthén, 1998-2015), other analyses were implemented in IBM SPSS Statistics (SPSS) version 23. Both types of software were run on Windows.

3. Published and Submitted Studies

The abovementioned research questions inspired the implementation of four empirical studies. To date (August 2017), the first two studies have already been published. The latter two have been submitted and are currently under review.

In the first study, LCA was used to derive five distinct JSO-subtypes based on their differential patterns of ACEs, and binary logistic regression analyses were conducted to identify distinct associations of these ACEs and subtypes with victim and offense characteristics of the JSOs' sexual index offenses (Barra, Bessler, Landolt, & Aebi, 2017a).

In the second study, specific ACEs (conjointly considered as maltreatment) as well as subtypes based on maltreatment patterns were investigated with regard to their time-dependent influences on sexual and nonsexual criminal persistence. For each of the considered time periods (i.e., early childhood, late childhood, and adolescence) LTA yielded three distinct JSO-subtypes. Maltreatment appeared to be of particular relevance for criminal persistence in JSOs when experienced with high severity, chronically, and/or when enduring into later stages of development (Barra, Bessler, Landolt, & Aebi, 2017c).

The third study approached the heterogeneity of JSOs by implementing LCA to derive four offense-related JSO-subtypes representing JSOs with offenses that (a) mainly included verbal or online sexual harassment; (b) mainly included nonconsensual touching; (c) mainly included severe (including penetrative) offenses against peers or adults; and (d) mainly included severe (including penetrative) offenses against children. The latter two subtypes showed the highest rates of psychosocial adversity (e.g., highest ACE scores) and were at increased risk of criminal persistence (Barra, Mokros, et al., 2017).

In the fourth study, ROC and regression analyses supported the predictive validity of two well-established and one newly introduced risk assessment instrument for JSOs, and pointed to the fact that risk prediction appears impeded in JSOs with greater offense severity and, moreover, JSOs with greater burden of cumulative ACEs (Barra, Bessler, Landolt, & Aebi, 2017b).

The four studies are described in full detail in the subsequent paragraphs. The following statements concerning acknowledgments, declaration of conflicting interests, and funding apply to each of the four studies:

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3.1 Study 1: Patterns of adverse childhood experiences in juveniles who sexually offended

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Abstract

Juveniles who sexually offended (JSOs) are differentially burdened with adverse childhood experiences (ACEs). The present study used Latent Class Analysis to derive subtypes of JSOs according to their patterns of 10 different ACEs. An extensive file analysis of 322 male JSOs (M_{age} = 14.14 years, SD_{age} = 1.94 years) revealed five subtypes with (a) multiple (9.0%), (b) mainly family-related (17.1%), (c) mainly peer-related (21.7%), (d) mainly neglectful (18.6%), and (e) little/no ACEs (33.5%). Differences among ACE-subtypes with regard to several offense and victim characteristics (e.g., the use of penetration or violence, the choice of a child, a male, a stranger, or multiple victims) were examined. Whereas no differences were found for the use of physical violence or the choice of male, stranger, or multiple victims, binary logistic regressions revealed associations of the multiple-ACE subtype with the choice of a child victim, the family-ACE subtype with the use of penetration as well as further nonsexual delinquency, the peer-ACE subtype with the use of penetration and the choice of a child victim, and the neglect-subtype with the choice of a child victim. Additional analyses including single ACE categories instead of LCA-derived subtypes supported these findings. Findings highlight the need for a comprehensive consideration of ACEs in research and clinical work to understand developmental pathways to juvenile sexual offending.

Keywords: juvenile sex offender, child maltreatment, latent class analysis, victim characteristics, offense characteristics

Introduction

A multitude of findings confirm the far-reaching detrimental effects of a wide range of intra- and extra-familial adverse childhood experiences (ACEs) on one's neurobiological, psychological, and social development. ACEs seem to have specific but also cumulative effects (in terms of dose-response relationships) on a variety of negative outcomes including

criminal and violent behaviors (e.g., Ballard et al., 2015; Duke et al., 2010; Felitti et al., 1998; Finkelhor et al., 2015; Teicher & Samson, 2016). The experience of abuse and neglect in early childhood has been seen as crucial to explain later criminal and violent behaviors for decades (e.g., Widom, 1989). In their recent review, Sood and Berkowitz (2016) emphasize the variety of "biological, individual, familial, social, and economic factors" (p. 2) that have contributed to the etiology of juvenile violence in prior research. At the same time, the authors highlight the role of early and current adversities in both intra- and extra-familial contexts. From a neurobiological perspective, ACEs may impair brain structures related to impulse control and emotion-regulation (e.g., prefrontal cortex; Teicher & Samson, 2016), resulting in higher probabilities of engaging in violent behavior (Fox et al., 2015).

Adolescents involved in the justice system showed considerably higher prevalence rates of abuse and neglect than community samples (Abram et al., 2004; Aebi, Linhart, et al., 2015; Baglivio et al., 2014). Moreover, delinquent juveniles were shown to be highly burdened by multiple coexisting and mutually dependent ACEs which exerted cumulative effects on the probabilities for early starting, violent, and continuing delinquent careers (Baglivio & Epps, 2016; Baglivio et al., 2015; Fox et al., 2015).

Juveniles who sexually offended (JSOs) represent a specific subgroup among delinquent youths with respect to ACEs in general and sexual victimization in particular. Besides elevated rates of intra-familial forms of violence as well as emotional and physical neglect, JSOs reported sexual victimization with five times higher odds compared to other juvenile offenders (Seto & Lalumière, 2010). The latter finding goes along with theories that underscore the prominent role of sexual victimization in the etiology of sexual coercion (e.g., Aebi, Landolt, et al., 2015; G. Ryan et al., 1987). However, by focusing on sexual victimization alone, other forms of ACEs that are prevalent among JSOs, e.g., emotional and physical neglect (Righthand & Welch, 2001), or peer bullying (Hendriks & Bijleveld, 2004), may be given too little attention. Similar to community and general juvenile offender samples, JSOs have rarely experienced specific ACEs in isolation (Rasmussen, 2013).

JSOs may be categorized in diverse subgroups according to their offense and victim characteristics, i.e., in terms of perpetration against a child, against a male, a stranger, or multiple victims, as well as the use of violence or penetration, and involvement in further non-sexual delinquency (e.g., Aebi et al., 2012; Hart-Kerkhoffs et al., 2009). A limited number of studies have compared the occurrence of ACEs in subgroups of JSOs based on victim and offense characteristics. For instance, JSOs who had conducted rape and/or other hands-on offenses were found to have elevated rates of physical abuse and sexual victimization (D. L.

Burton, 2003; Fehrenbach, Smith, Monastersky, & Deisher, 1986). JSOs with child victims were found to be more often exposed to a multiplicity of ACEs, i.e., to sexual victimization, peer bullying, social isolation, and caregiver changes, compared to JSO with peer/adult victims (Gunby & Woodhams, 2010; Hendriks & Bijleveld, 2004; Seto & Lalumière, 2010). Furthermore, JSOs who had perpetrated against male victims showed elevated rates of sexual victimization (Kaufman, Hilliker, & Daleiden, 1996; Worling, 1995). However, potential effects of coexisting ACEs appear understudied in this context although their importance has been mentioned previously in general juvenile offending (e.g., Baglivio & Epps, 2016).

The coexistence of ACEs has usually been accounted for by building a cumulated score as proposed by the original ACE study (Felitti et al., 1998). However, this score falls short on taking into account the effects of specific combinations of ACEs and their mutual dependencies. Yet, previous research has underscored the elevated informative value of specific ACE-combinations compared to a cumulative score that only reflects the number of ACEs (Berzenski & Yates, 2011; Teicher & Samson, 2016). Thus, person-oriented approaches like Latent Class Analysis (LCA) appear fruitful in research on ACEs (Roesch, Villodas, & Villodas, 2010). LCA accounts for the number, the sorts, and the specific combinations of ACEs by assigning individuals to exclusive homogenous subtypes based on their individual ACE patterns. Distinct relations of these subtypes to outcome variables may allow a sophisticated ground for theoretical deductions and practical implications (Witt et al., 2016). The few studies that have examined ACEs using LCA revealed particular subtypes of adolescents burdened with multiple ACEs whereas single ACEs were rare (Aebi, Linhart, et al., 2015; Ford, Grasso, Hawke, & Chapman, 2013).

To the best of our knowledge, no previous study has applied LCA to examine distinct ACE patterns in JSOs despite the abovementioned advantages. Still, the usage of advanced statistical approaches to identify which JSOs are most burdened with ACEs and what patterns of ACEs relate to different offense/victim characteristics is of importance for both research and intervention purposes: It may yield a differentiated picture of the associations between ACEs and juvenile sexual offending which may inspire future research on respective developmental theories and specific treatment and prevention approaches.

Meeting the lack of person-oriented approaches to examine ACEs in JSOs, we (a) analyzed the patterns of multiple intra- and extra-familial ACEs in a large sample of male JSOs using LCA; and (b) related derived subtypes to a range of offense and victim characteristics, namely the use of penetration, the use of physical violence, and perpetration against a child victim, multiple victims, a male victim, and a stranger victim. Because ACEs have been

consistently related to nonsexual delinquency too, we further investigated the associations of ACE-patterns with a co-occurring nonsexual offenses.

LCA was expected to reveal subtypes of JSOs that differed regarding the number and the sorts of ACEs. Based on previous findings, we expected to find a low-ACE subtype, a multiple-ACE subtype, and a specific sexual victimization subtype. Relying on research promoting dose-response-relationships between ACEs and outcome severity (Anda et al., 2006; Duke et al., 2010; Maas, Herrenkohl, & Sousa, 2008), the multiple-ACE subtype was expected to relate to the use of penetration and violence. Choosing a child victim was also expected to be associated with the multiple-ACE subtype and the sexual victimization subtype. Choosing a male victim was expected to relate to the sexual victimization subtype.

In order to embed our findings into prior research, we conducted additional variable-oriented analyses with ACEs as single measures and a cumulated ACE score. Analogous to the multiple-ACE subtype, we expected the cumulated ACE score to be positively related to the use of penetration and violence, and the choice of a child victim.

Besides common indicators of juvenile delinquent and risk behaviors such as low socioeconomic status (SES) and age (e.g., DeLisi, Neppl, Lohman, Vaughn, & Shook, 2013; Kipping, Smith, Heron, Hickman, & Campbell, 2015), we added foreign nationality as a covariate because Switzerland has been shown to have high rates of migration, and previous research indicated that juveniles with foreign nationalities were overrepresented in the Swiss justice system (Killias, 2009). Moreover, further European studies showed that JSOs with foreign nationalities differed from domestic adolescent delinquents in regard to social and health adversities (e.g., Aebi et al., 2012; Bauer et al., 2011; Colins et al., 2013). Furthermore, prior nonsexual delinquency was considered because general offending had been related to both ACEs and sexual coercion (e.g., Fox et al., 2015; Seto & Lalumière, 2010).

Methods

Procedures

We intended to analyze the judicial and medical files of all adolescents who had been convicted for a sexual offense (except convictions for pornography only) according to the Swiss penal law between January 2007 and September 2014 in all 17 Swiss cantons (states) with German as a major language. Yet, juvenile justice authorities of three respective cantons refused participation (concerning about 16.9% of convictions according to official national statistics). Files from the remaining 14 cantons were analyzed between February and December 2015. Data extraction was guided by a specifically-developed documentation system based on an adaptation of the Forensic Psychiatric Documentation System (Nedopil et al.,

1986). It had been modified for juveniles and complemented for assessing ACEs following existing instruments (see below). Data were collected by an experienced forensic psychologist, a doctoral student of forensic psychology, and a masters-level psychology student. To assess interrater reliability, the two forensic psychologists independently double-rated 30 randomly selected cases stratified by file content (presence vs. absence of psychiatric/psychological expert opinion) and residential area (urban vs. rural). Cohen's kappa (κ) and the intraclass correlation coefficient (*ICC*; two-way random-based approach on single measure, absolute agreement) were calculated for nominal and metric variables, respectively. Based on the recommendation by Landis and Koch (1977) and Fleiss (1981), values above .60 were considered substantial. Study procedures were approved by the local ethics committees and the justice departments of each canton involved.

Sample

Case files of 687 JSOs (males: n = 673, 98.0%; females: n = 14, 2.0%) were analyzed. In order to assure data accuracy on developmental and criminal histories and to reliably derive ACEs, the present study was based only on those files that contained anamnestic information from psychiatric/psychological expert opinions, therapeutic documentations, and/or clarification reports referring to a JSO's health and social development. At the beginning of the trial, the judicial institution in charge could have commissioned the respective reports from a forensic or clinical psychiatrist or psychologist, psychotherapist, or social worker, or could have demanded them from prior involved professionals in order to gain a comprehensive picture of a JSO's development. Respective information could have been incorporated in the decision-making process about awarding penalties and/or interventions. However, anamnestic reports were only available for a fraction of examined case files (n = 325). The proportion of female JSOs was too small for statistical analyses (n = 3, 0.3%), so their data were excluded. The final sample consisted of 322 male JSOs aged 8.50 to 18.50 years at the time of the first sexual assault that had led to a conviction during the abovementioned time period (M = 14.14 years, SD = 1.94 years). Most of these convictions involved one sexual coercive act (n = 148, 46%) whereas the mean number was 7.34 (range = 1–560; Mdn = 2).

Measures

ACEs. The present study included ACEs that had occurred before a JSO's first sexual assault that had led to a conviction during the abovementioned time period. The assessment of ACEs was guided by the definitions of the 10 ACE-categories introduced in the German version (Isele et al., 2014) of the Maltreatment and Abuse Chronology of Exposure (MACE) scale (Teicher & Parigger, 2015; see Table 2). Because non-contact sexual abuse, e.g., sexual

harassment via Internet or exposure to pornography, displays a growing type of sexual coercion (Mohler-Kuo et al., 2014) not covered by the MACE scale, additional information from the Child Sexual Abuse Questionnaire (CSAQ; Mohler-Kuo et al., 2014) was incorporated to code whether a JSO had experienced sexual victimization himself. An ACE was dichotomously coded as present when information in the case files pointed to its overall occurrence. ACEs were summed up to a cumulated score ranging from 0 to 10 (*ICC* = .86).

First analyses of the MACE scale point to satisfactory convergent and divergent validities compared to the Child Trauma Questionnaire (CTQ; Bernstein et al., 1994) and the Adverse Childhood Experience (ACE) scale (Felitti et al., 1998), and several psychiatric symptom measures, respectively (Isele et al., 2014; Teicher & Parigger, 2015). Good to excellent ($r > .50$) test-retest reliabilities have been proven for self-reported MACE subscales (Teicher & Parigger, 2015). As one of the first studies using the CSAQ, Aebi, Landolt, et al. (2015) mentioned moderate agreement ($\kappa = 0.41$, $p = .001$) with the Juvenile Victimization Questionnaire (JVQ; Hamby, Finkelhor, Ormrod, & Turner, 2004), which, however, comprises fewer items on sexual victimization than the CSAQ. No studies have yet implemented validity and reliability ratings for the MACE categories in file reviews. The present interrater reliabilities, however, point to their applicability for this kind of data collection (see Table 2).

Offense and victim characteristics. Penetration was coded as present when at least one of the convicted sexual assaults included (attempted) vaginal and/or anal penetration ($\kappa = .87$). Physical violence during the convicted sexual assaults was assessed on a 4-point Likert-scale with 0 (= *no violence*), 1 (= *restrained/beat victim once*), 2 (= *bodily harm with temporary marks*), and 3 (= *bodily harm requiring medical care*; *ICC* = .64). When the use of violence differed among multiple convicted sexual assaults, ratings referred to the assault with the highest degree of violence. A JSO was considered to have had a child victim when at least one of his victims was three or more years younger than himself and not older than 12 years of age ($\kappa = .93$). In this way, a victim's age and the age difference between victim and perpetrator were simultaneously taken into account as suggested by prior research (Skubic Kemper & Kistner, 2010). Former studies have used a cut-off of 12 years of age for child victims, and the Swiss penal code requires an age difference of at least three years of age for the definition of sexual acts against a child (e.g., Aebi et al., 2012). A JSO was considered to have had multiple victims when his currently convicted sexual assaults involved at least two victims ($\kappa = 1.00$). Male victim was coded as present when a JSO had sexually perpetrated against at least one male victim in the framework of his current conviction ($\kappa = 1.00$). Stranger victim was coded as present when a JSO had sexually perpetrated against at least one victim that he had

not known before, not even by sight (κ = .89). Current nonsexual delinquency was coded as present when a JSO has gotten at least one conviction for nonsexual delinquent behavior in the course of the current court proceedings (κ = .63).

Covariates. The age at the time of the first sexual assault that had led to a conviction during the abovementioned time period (*ICC* = .90) and foreign nationality (κ = 1.00) were directly coded from the case files. Analogous to prior research from Switzerland (e.g., Aebi et al., 2012; Killias, 2009), foreign nationality was coded as present when the JSO did not have a Swiss nationality. This definition included that both parents were of non-Swiss origin and neither the JSO nor his family had yet been naturalized. SES was defined by categorizing the occupations of each JSO's caregivers on a scale from 1 (= *executive manager*) to 9 (= *unskilled worker*) as proposed by the International Standard Classification of Occupations (ISCO-08) guidelines (International Labour Organization, 2012). SES was coded as low when both caregivers were unskilled workers or unemployed, or when one caregiver was an unskilled worker or unemployed while information on the occupational status of the other was missing (κ = .79). Prior nonsexual delinquency was coded as present when charges had been pressed against a JSO for perpetration of nonsexual delinquent acts before the current court proceedings (κ = 1.00).

Statistical Analyses

LCA with robust maximum likelihood estimation was performed in Mplus 7.31 (Muthén & Muthén, 1998-2015). Each JSO was assigned to the latent class for which his membership probability was highest based on individual response patterns to assessed ACEs. An index which quantifies the clearness of these assignments is the entropy value. For the present approach, an entropy value of at least .80 is recommended (Clark & Muthén, 2009). To identify the model that fitted the data best, solutions with gradually increasing numbers of latent classes were compared to each other on several parameters. For the present study, the Akaike Information Criterion (AIC; Akaike, 1974), the Bayesian Information Criterion (BIC; Schwarz, 1978), and the sample-size adjusted Bayesian Information Criterion (aBIC; Sclove, 1987) were included as fit indicators. The model with the smallest fit indicators shows the best balance of fit and parsimony. Furthermore, significant test statistics of the Lo-Mendell-Rubin Likelihood Ratio Test (LMR LRT; Lo, Mendell, & Rubin, 2001) and the Bootstrapped parametric Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000), which compare a model with *k* classes to a model with (*k*-1) classes, indicate that the inclusion of an additional latent class has enhanced model fit. The aBIC appeared superior to the AIC and BIC for categorical models and the BLRT outperformed the LMR LRT (Nylund, Asparouhov, & Muthén, 2007).

Table 2

Descriptions, Interrater Reliabilities, and Prevalence Rates of Adverse Childhood Experiences in Male Juveniles Who Sexually Offended (N = 322)

ACE		Content (exemplary)		Prevalence	
			κ	*n*	%
PVA	parental verbal abuse[a]	JSO was shouted at, verbally humiliated, or threatened several times a year.	.66	85	26.4
PNVEA	parental nonverbal emotional abuse[a]	JSO was confined or forced to take adult responsibilities several times a year.	.57	112	34.8
PPA	parental physical abuse[a]	JSO was physically punished several times a year.	1.00	100	31.1
PEERE	peer emotional abuse[a]	JSO was actively excluded or verbally humiliated several times a year.	.78	129	40.1
PEERP	peer physical bullying[a]	JSO was punched, kicked, or forced to do something against his will several times a year.	.59	58	18.0
EN	emotional neglect[a]	JSO experienced lack of family cohesion or (un)witting absence of a caregiver several times a year.	.77	194	60.2
PN	physical neglect[a]	JSO experienced lack of basic physical needs or insufficient surveillance several times a year.	.67	124	38.5
WITP	witnessing violence between parents[a]	JSO witnessed physical violence from male caregiver towards female caregiver and vice versa several times a year.	.65	57	17.7
WITS	witnessing violence toward siblings[a]	JSO witnessed threats or physical/sexual assaults against a sibling by a caregiver several times a year.	1.00	27	8.4
SEX	sexual victimization[a, b]	JSO was forced to sexual activities by a caregiver or peer, or was harassed without contact including through electronic means several times a year.	.86	51	15.8

Note. ACE = adverse childhood experience, JSO = juvenile who sexually offended.
[a] Maltreatment and Abuse Chronology of Exposure scale (Isele et al., 2014; Teicher & Parigger, 2015).
[b] Child Sexual Abuse Questionnaire (Mohler-Kuo et al., 2014).

Additionally, the interpretability of the latent classes was taken into account for model selection (Nylund et al., 2007). To avoid biased results due to local instead of global maxima, 5000 random starts were implemented. Further analyses were conducted in IBM SPSS 23. Besides group comparisons (ANOVAs, Kruskal-Wallis tests, t-tests, Games-Howell tests, χ^2-

tests), binary logistic and ordinal regressions were performed including ACEs, age, low SES, foreign nationality, and prior nonsexual delinquency.

Results

Sample Characteristics

In the present sample, 191 juveniles (59.3%) had involved penetration in their sexual assaults, 158 juveniles (49.1%) had perpetrated against a child, 74 (23.0%) against multiple, 94 (29.2%) against a male, and 41 (12.7%) against stranger victims. A total of 135 (41.9%) had used any kind of physical violence. Current nonsexual delinquency was present in 96 juveniles (30.6%). The use of penetration was significantly related to elevated violence scores, $\chi^2(3) = 23.88$, $p < .001$. The choice of a child victim was associated with enhanced rates of having had a male victim, $\chi^2(1) = 33.43$, $p < .001$, and decreased rates of having had a stranger victim, $\chi^2(1) = 5.87$, $p = .015$, involving violence, $\chi^2(3) = 59.45$, $p < .001$, and current nonsexual delinquency, $\chi^2(1) = 47.69$, $p < .001$. Equally, the choice of a male victim was negatively associated with having had a stranger victim, $\chi^2(1) = 16.27$, $p < .001$, and current nonsexual delinquency, $\chi^2(1) = 12.0$, $p < .001$. The choice of a stranger victim was related to increased rates of having multiple victims, $\chi^2(1) = 8.68$, $p = .003$, enhanced violence scores, $\chi^2(3) = 9.81$, $p = .020$, and higher rates of current nonsexual delinquency, $\chi^2(1) = 10.7$, $p = .001$. Current nonsexual delinquency was further associated with elevated violence scores, $\chi^2(3) = 21.61$, $p < .001$.

The minority of JSOs ($n = 90$, 28.0%) had foreign nationalities, most commonly from the Balkan States (Serbia, Montenegro, Kosovo, Macedonia, Albania; $n = 28$, 8.5%), followed by Turkey ($n = 14$, 4.3%), Italy ($n = 9$, 2.8%), Portugal ($n = 8$, 2.5%), and Germany ($n = 6$, 1.9%). Further 17 foreign nationalities were found, each representing less than 1% of the JSOs. Forty-seven JSOs (16.0%) were from families with low SES. Foreign nationality and low SES were not statistically related, $\chi^2(1) = .70$, $p = .404$. Eighty-eight JSOs (27.3%) showed histories of prior nonsexual delinquency. For instance, prior charges had been pressed against 54 JSOs (16.8%) for property crimes (including theft and property damage; $\kappa = .67$) and 13 JSOs (4.0%) for drug-related crimes ($\kappa = 1.0$). Moreover, 12 JSOs (3.7%) had been charged for prior sexual assaults ($\kappa = 1.0$). The majority of the sample ($n = 243$, 75.5%) did not have any prior charges from these categories, 52 (16.1%) had charges from one, 19 (5.9%) from two, 7 (2.2%) from three, and one (0.3%) from all four categories. For about one third of the sample ($n = 96$. 29.8%) current convictions included nonsexual crimes as well.

The JSOs considered for the present study were slightly younger than the 351 excluded male JSOs ($M = 14.82$, $SD = 1.89$), $t(670) = 4.56$, $p < .001$, who were more often of for-

eign nationality (n = 150, 42.9%), $\chi^2(1) = 16.01$, $p < .001$, as well as from families with low SES (n = 51, 24.2%), $\chi^2(1) = 5.35$, $p = .021$. Excluded JSOs showed fewer offenses that included penetration (n = 114, 32.5%), $\chi^2(1) = 48.81$, $p < .001$, as well as fewer cases involving a child victim (n = 77, 21.9%), $\chi^2(1) = 54.40$, $p < .001$, multiple victims (n = 43, 12.3%), $\chi^2(1) = 13.46$, $p < .001$, and a male victim (n = 68, 19.4%), $\chi^2(1) = 8.86$, = .003. No differences were found for the involvement of a stranger victim (n = 42, 12.0%), $\chi^2(1) = .09$, $p = .762$, physical violence (U = 53,946.00, $p = .246$), and current nonsexual delinquency (n = 85, 25.1%), $\chi^2(1) = 2.39$, $p = .122$. Missing anamnestic information from excluded JSOs prohibited group comparisons regarding prior crime histories.

Subtypes of ACEs

Prevalence rates of the 10 ACEs varied between 8.4% (witnessing violence towards siblings) and 60.2% (emotional neglect; Table 2). LCA-solutions with one to nine classes were compared to each other (Table 3).

The aBIC was smallest for the five-class solution. The significant LMR LRT and BLRT indicated that choosing five classes significantly enhanced model fit compared to a four-class model. The entropy value represented a clear class assignment in the five-class model. These five classes were interpretable straightforwardly (see below). The AIC favored the six-class solution. However, neither LMR LRT nor BLRT were significant, indicating that the six-class model did not lead to a significantly better fit to the data than the five-class model. The smallest BIC was found for the two-class solution. Its choice, however, was not supported by LMR LRT or BLRT. Taking into account the abovementioned superiority of the aBIC over AIC and BIC, the results of LMR LRT and BLRT, and the interpretability of the latent classes, the five-class model was selected for further analyses (Figure 8).

LCA identified a multiple-ACE subtype (n = 29, 9.0%) with 7.55 ACEs on average, a family-ACE subtype (n = 55, 17.1%) with 5.42 ACEs on average, a neglect-only subtype (n = 60, 18.6%) with 2.92 ACEs on average, a peer-ACE subtype (n = 70, 21.7%) with 2.66 ACEs on average, and a low-ACE subtype (n = 108, 33.5%) with 0.55 ACEs on average. An ANOVA with Games-Howell post-hoc tests revealed that all ACE-subtypes differed from each other on their mean cumulated ACE score ($p < .001$) with the exception of the neglect-only and the peer-ACE subtypes ($p = .53$).

A two-class solution would have only differentiated between JSOs with high and JSOs with low item response probabilities on each ACE. The four- and the six-class models would have displayed similar class compositions compared to the five-class solution. However, the four-class model would have lacked a multiple-ACE subtype whereas the six-class

model would have additionally indicated a separate class with medium to high item response probabilities on the items representing parental abuse (parental verbal abuse, parental non-verbal emotional abuse, and parental physical abuse) but low item response probabilities on emotional and physical neglect (data not shown).

Relations of ACE Subtypes to Offense and Victim Characteristics

Differences among ACE-subtypes were found in the proportions of JSOs who used penetration and had chosen a child victim as well as in the proportions of current nonsexual delinquency (Table 4). The adjusted residuals showed that the low-ACE subtype was associated with fewer penetrations and child victims. The family-ACE subtype was associated with more penetration and more current nonsexual delinquency, the peer-ACE subtype with a more frequent choice of a child victim and less current nonsexual delinquency. Subtypes did

Table 3

Model Parameters of Latent Class Analyses Based on 10 ACEs for Male Juveniles Who Sexually Offended (N = 322)

Model	Log Likelihood	AIC	BIC	aBIC	*p* (LMR LRT)	*p* (BLRT)	Entropy
1-Class	-1776.81	3573.63	3611.37	3579.65	-	-	-
2 Class	-1541.12	3124.24	3203.51	3136.90	.000	.000	.88
3-Class	-1513.32	3090.64	3211.43	3109.93	.060	.000	.83
4-Class	-1486.21	3058.41	3220.72	3084.33	.035	.000	.80
5-Class	-1467.89	3043.78	3247.60	3076.32	.038	.000	.81
6-Class	-1455.31	3040.62	3285.97	3079.80	.244	.167	.80
7-Class	-1446.79	3045.58	3332.45	3091.39	.147	.267	.82
8-Class	-1439.58	3053.15	3381.54	3105.58	.097	.600	.85
9-Class	-1432.40	3060.80	3430.70	3119.86	.195	.667	.86

Note. AIC= Akaike Information Criterion, BIC = Bayesian Information Criterion, aBIC = adjusted Bayesian Information Criterion, LMR LRT = Lo-Mendell-Rubin Likelihood Ratio Test, BLRT = Bootstrapped Likelihood Ratio Test.

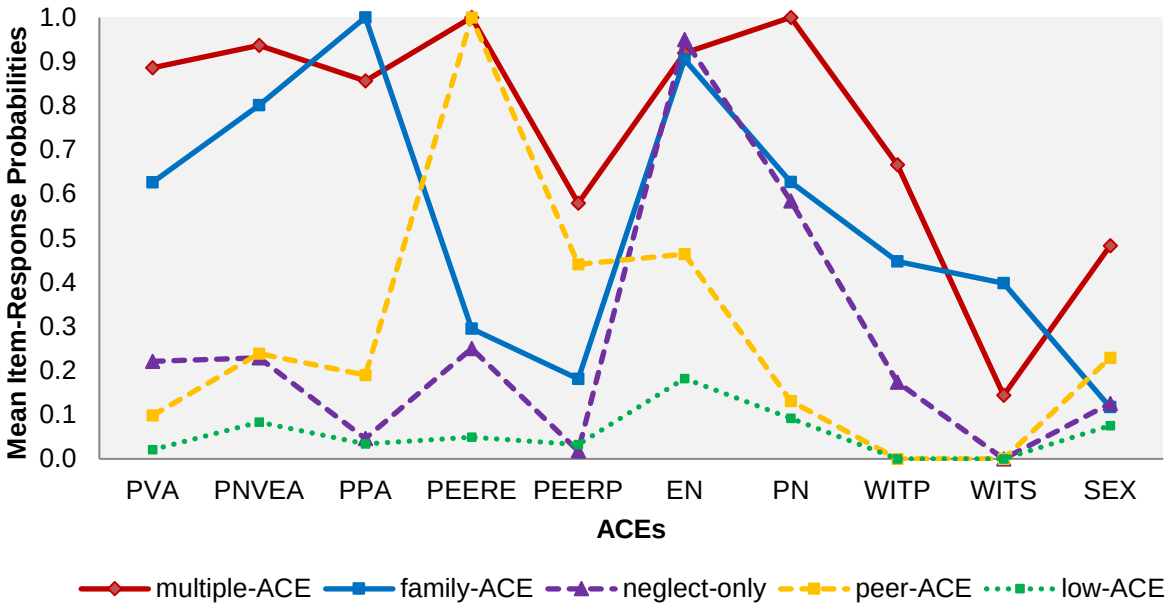

Figure 8. Five class solution of the latent class analysis based on mean item-response probabilities. ACEs = adverse childhood experiences, PVA = parental verbal abuse, PNVEA = parental nonverbal emotional abuse, PPA = parental physical abuse, PEERE = peer emotional abuse, PEERP = peer physical bullying, EN = emotion neglect, PN = physical neglect, WITP = witnessing violence between parents, WITS = witnessing violence toward siblings, SEX = sexual victimization.

not differ in regard to the use of physical violence, $\chi^2(4) = 4.81$, $p = .308$, perpetration against multiple victims, $\chi^2(4) = 3.92$, $p = .417$, perpetration against a male victim, $\chi^2(4) = 7.06$, $p = .133$, and perpetration against a stranger victim, $\chi^2(4) = 4.73$, $p = .316$.

Binary logistic regressions were performed on the outcome variables that differed among subtypes (Table 5). The low-ACE subtype served as a reference group. The multiple-ACE subtype was associated with the choice of a child victim. The neglect-only subtype was associated with the choice of a child victim, too. The family-ACE subtype was associated with penetration and current nonsexual delinquency. The peer-ACE subtype was associated with penetration and the choice of a child victim. The relation between using penetration and choosing a child victim was not significant for this subtype, $\chi^2(1) = 0.16$, $p = .688$, although more JSOs from the peer-ACE subtype used penetration against children than against peers/adults ($n = 17$ vs. $n = 10$).

Relations of Single and Cumulated ACEs to Offense and Victim Characteristics

Variable-oriented analyses of single ACEs partly converged with findings from the person-oriented analyses. Several group differences in ACE prevalence rates were found between JSOs showing and those not showing the present outcome characteristics (Table 6).

Table 4

Differences in Proportions of Penetration, Choice of a Child Victim, and Current Nonsexual Delinquency Related to ACE-Subtypes

	ACE-subtype (*N*)																
	Low-ACE (108)			Peer-ACE (70)			Neglect-only (60)			Family-ACE (55)			Multiple-ACE (29)			Group comparison	
Outcome	*n*	%	*AR*	*n*	%	*AR*	*n*	%	*AR*	*n*	%	*AR*	*n*	%	*AR*	χ^2	*df*
Penetration	23	21.3	-3.2	27	38.6	1.1	20	33.3	0.0	26	47.3	2.4	11	37.9	0.6	13.01*	4
Child victim	41	38.0	-2.8	42	60.0	2.1	36	60.0	1.9	24	43.6	-0.9	16	55.2	0.7	13.14*	4
Current nonsexual delinquency	30	28.3	-0.5	13	18.6	-2.4	20	33.9	0.7	25	46.3	2.8	8	28.6	-0.2	11.71*	4

Note. ACE = adverse childhood experience, *AR* = adjusted residual. Significant deviations from the expected cell counts are indicated by *AR* values of ≥ 2.0 (more than expected) and ≤ -2.0 (less than expected).
*$p < .05$.

Table 5

Binary Logistic Regressions for Penetration, the Choice of a Child Victim, and Current Nonsexual Delinquency

Indicators	Penetration			Child victim			Current nonsexual delinquency		
	OR	95% CI		*OR*	95% CI		*OR*	95% CI	
		LL	*UL*		*LL*	*UL*		*LL*	*UL*
ACE Subtype									
Peer-ACE	2.37*	1.15	4.88	2.48*	1.23	5.01	0.70	0.31	1.59
Neglect-only	1.60	0.71	3.6	4.26**	1.86	9.77	1.26	0.55	2.88
Family-ACE	3.84**	1.75	8.41	2.06	0.92	4.58	2.42*	1.06	5.53
Multiple-ACE	2.02	0.76	5.34	4.75**	1.63	13.79	0.61	0.21	1.82
Age at first sexual offense	0.77***	0.66	0.89	0.75***	0.65	0.87	1.21*	1.03	1.42
Low SES	1.47	0.74	2.9	0.67	0.32	1.40	0.81	0.37	1.78
Foreign nationality	0.86	0.47	1.56	0.43**	0.23	0.80	1.46	0.78	2.74
Prior general delinquency	1.13	0.59	2.15	0.19***	0.10	0.39	5.48***	2.92	10.31

Note. The low-ACE subtype served as reference group. ACE = adverse childhood experience, *OR* = odds ratio, *CI* = confidence interval, *LL* = lower limit, SES = Socioeconomic status, *UL* = upper limit.
*$p < .05$, **$p < .01$, ***$p \leq .001$.

Table 6

Associations of Single ACEs With Outcome Variables

ACE	Penetration		Child victim		Multiple victims		Male victim		Stranger victim		Current nonsexual delinquency		Physical violence	
	χ^2	*df*	χ^2	*df*	χ^2	*df*	χ^2	*df*	χ^2	*df*	χ^2	*df*	χ^2	*df*
Parental verbal abuse	0.41	1	0.59	1	0.06	1	0.79	1	0.10	1	0.37	1	5.76	3
Parental nonverbal emotional abuse	2.84	1	1.21	1	0.09	1	0.48	1	0.01	1	1.65	1	1.47	3
Parental physical abuse	10.66***	1	1.11	1	1.50	1	0.10	1	0.98	1	8.97**	1	0.42*	3
Peer emotional abuse	3.86*	1	6.61**	1	1.78	1	3.37	1	1.49	1	0.47	1	1.58	3
Peer physical bullying	4.29*	1	0.59	1	0.74	1	1.68	1	0.03	1	0.06	1	2.43	3
Emotional neglect	5.31*	1	0.92	1	0.00	1	2.76	1	0.01	1	5.23*	1	4.19	3
Physical neglect	6.89**	1	3.55	1	0.09	1	0.00	1	3.21	1	5.54*	1	12.78**	3
Witnessing violence between parents	0.41	1	2.01	1	0.19	1	0.01	1	2.04	1	0.95	1	1.68	3
Witnessing violence toward siblings	1.67	1	0.29	1	0.02	1	2.95	1	0.75	1	0.25	1	1.51	3
Sexual victimization	1.73	1	7.25**	1	1.27	1	13.92***	1	0.05	1	0.00	1	3.89	3

Note. ACE = Adverse childhood experience.
*$p < .05$, **$p < .01$, ***$p \leq .001$.

Subsequent regression analyses found the use of penetration positively related to parental physical abuse, p = .018, *OR* = 2.06, 95% CI [1.13, 3.75]. The choice of a child victim was positively associated with emotional abuse by peers, p = .015, *OR* = 1.95, 95% CI [1.14, 3.35]. Moreover, the choice of a male victim was positively related to sexual victimization, p = .002, OR = 2.92, 95% CI [1.50, 5.67]. Regression analyses did not reveal any significant effects of single ACEs on perpetration against a stranger victim, multiple victims, current nonsexual delinquency, and the use of physical violence. The cumulated ACE score was higher for JSOs who used penetration, $t(320) = 3.22$, p = .001, and for those who showed further nonsexual delinquency, $t(315) = 1.99$, p = .047. No differences were found with regard to the choice of a child victim, $t(320) = 0.94$, p = .348, multiple victims, $t(320) = -0.068$, p = .946, a male victim, $t(320) = 0.58$, p = .560, and a stranger victim, $t(320) = -0.02$, p = .983, as well as for the use of physical violence, $F(3, 318) = 2.26$, p = .082. Further Spearman-Rho correlations revealed that an elevated number of ACEs was not related to elevated violence scores (r_s = .08, p = .153). Regression analyses revealed a positive association of the cumulated ACE score with using penetration, p = .003, *OR* = 1.18, 95% CI [1.06, 1.32] but not with showing further nonsexual delinquency, p = .421, *OR* = 1.05, 95% CI [0.93, 1.19].

Discussion

In the present study, the heterogeneity among JSOs was examined by empirically deriving subtypes based on their ACE-patterns and comparing these subtypes in regard to their relations to offense and victim characteristics. LCA revealed five subtypes that differed in the number and sorts of ACEs. Low levels of ACEs were found in about one third of the JSOs, leaving 66.5% with high probabilities for the occurrence of several ACEs. This displays a higher rate compared to community and other juvenile offender samples (Aebi, Linhart, et al., 2015; Ballard et al., 2015; Ford et al., 2013). Three moderate ACE-subtypes differed insofar as one was characterized by abuse and neglect in the family context, one by family-neglect only, and one by elevated scores on peer-bullying. Almost one tenth of the sample contained highly affected poly-victims with ACEs from intra- and extra-familial contexts. Taken together, these findings underscore the heterogeneity of JSOs concerning ACEs and prove that the majority of these adolescents are highly burdened (Rasmussen, 2013).

Despite prior research underscoring sexual victimization as a major risk factor for sexual perpetration (e.g., Aebi, Landolt, et al., 2015), the majority of JSOs was not found sexually abused and the prevalence rate of sexual victimization in the present JSOs appeared comparable to other community and criminal youth samples (Mohler-Kuo et al., 2014; Seto et al., 2010). Sexual victimization (a) only showed low to medium prevalence probabilities in

the latent classes; and (b) never occurred in isolation. This was contrary to our assumption of a specific sexual-victimization subtype, yet consistent with the finding that sexual victimization commonly coexists with other adversities (e.g., Aebi, Linhart, et al., 2015). However, comparisons of prevalence rates between the present and other samples are limited due to different methods of data collection. ACE rates from self-reports are usually higher than those extracted from other sources, e.g., because psychological and medical reports might only mention more severe cases (Stoltenborgh et al., 2015). Although the present case files included information from external sources and the JSOs themselves, we cannot exclude the possibility that some JSOs had not been asked about sexual victimization. In fact, a recent prospective study that relied on official maltreatment reports found that only a small number of juveniles who had conducted sexual assaults showed a history of sexual victimization. Moreover, poly-victimization appeared to play a more important role in sexual offending than sexual victimization on its own (Leach et al., 2016).

Although several offense and victim characteristics were significantly interrelated, we found that they were distinctly associated with certain ACE-subtypes. Respective findings may build a foundation for the development of differentiated etiological hypotheses to be examined by future research. The neglect-only subtype showed elevated odds of having had a child victim. Neglected children who had experienced parental disinterest rather than loving care have been shown to develop anxious attachment styles that go along with deficient social competence and may lead to an incapacity to establish close relationships with peers (Finzi, Ram, Har-Even, Shnit, & Weizman, 2001; Miner, Knight, Berg, Romine, & Netland, 2010). Thus, aiming at satisfying intimate needs, neglected JSOs may target children out of fear of being refused by peers (Miner et al., 2010). The family-ACE subtype was associated with elevated offense severity in terms of using penetration. Those JSOs had experienced active (most likely physical) abuse by their caregivers. This finding corresponds to prior research linking abusive experiences to the development of an avoidant attachment style, which again predicted elevated severity of sexual coercion (Finzi et al., 2001; Smallbone & Dadds, 2000). Furthermore, the family-ACE subtype was the only subtype related to current nonsexual delinquency which goes along with findings that highlight the role of parental maltreatment in the development of general delinquent behavior (e.g., Hollist et al., 2009).

The peer-ACE subtype was related to both the choice of a child victim and penetration. Bullied adolescents are less popular in their social peer networks and struggle more often with self-esteem issues than their peers (de Bruyn, Cillessen, & Wissink, 2010; Hawker & Boulton, 2000). In addition to the fact that their isolated position hinders the establishment of

age-appropriate intimate contacts, they may seek to overcome perceptions of intra- and interpersonal insufficiency by targeting children over whom they can exercise power and control (Drapeau, Beretta, de Roten, Koerner, & Despland, 2008). The relation between the peer-ACE subtype and using penetration may partly be dependent on the higher rate of choosing a child victim in bullied JSOs. Their superordinate position over the child may facilitate JSOs to include more severe forms of sexual coercion without resistance (Aebi et al., 2012). However, the relation between the two outcome variables did not reach statistical significance. Peer-ACEs appear to display a severe stressor associated with elevated offense severity in JSOs independent of victim choice.

The multiple-ACE subtype was associated with targeting a child victim. This result converges with findings about the various burdens in JSOs with child victims regarding both intra- and extra-familial adversities (e.g., Gunby & Woodhams, 2010). Negative experiences in multiple contexts may elevate the negative self-perceptions associated with single ACE-categories (e.g., peer-ACEs) and contribute to a generalized feeling of powerlessness and loss of control. Thus, the desire to regain power and control may be amplified in polyvictims (G. Ryan, 1989; H. A. Turner, Shattuck, Finkelhor, & Hamby, 2017). As mentioned above, this goal may be easier to reach by approaching children instead of peers or adults (Drapeau et al., 2008).

The multiple-ACE subtype was not related to the use of penetration. This finding was somewhat unexpected, as theories on dose-response relationships would suggest that elevated ACE scores would relate to enhanced outcome severity (e.g., Duke et al., 2010). In fact, the cumulated ACE score was associated with the use of penetration. These opposing findings might be partly due to insufficient statistical power of the multiple-ACE subgroup based on its limited sample size. Nevertheless, the approach to consider multiple ACEs by relying on cumulated ACE scores only is challenged by the present results. The peer-ACE subtype, for example, is characterized by significantly fewer ACEs compared to the family-ACE subtype although both significantly relate to offense severity in terms of penetration. Moreover, advantages of respecting specific ACE-combinations become apparent by considering that further nonsexual delinquency, for instance, was neither related to specific single ACEs nor their cumulated number but to the family-ACE subtype. Thus, referring to single ACEs or a cumulated score which respects the coexistence of ACEs only by their number may not be informative enough to explain certain outcomes but the actual combinations of specific ACEs may be more enlightening (Berzenski & Yates, 2011; Teicher & Samson, 2016). Results further point to the importance of considering ACEs in the peer-context, as the peer-ACE sub-

type was the only latent class that was related to both penetration and the choice of a child victim.

ACE-subtypes did not differ on the further outcome variables. It was surprising that the use of physical violence was not related to neither ACE-subtypes nor the cumulated ACE-score taking into account findings that highlight the positive relations between ACEs and violent behavior (e.g., Duke et al., 2010; Maas et al., 2008). However, comparability is limited because definitions of violence differ among studies. Furthermore, the degree of violence during a sexual offense might be better explained by factors not covered in the present study such as the degree of control a JSO has over his victim (Hunter et al., 2000). Eventually, because no sexual victimization subtype emerged, we could not confirm our hypotheses about its possible relations to the choice of a child and/or male victim. In fact, choosing a male victim was, in contrast to choosing a child victim, not associated with any ACE-subtype. However, additional analyses revealed that sexual victimization displays an important influencing factor of victim choice. In accordance with previous research and learning theories, male JSO who had been sexually victimized tended to sexually perpetrate against male and child victims (e.g., Worling, 1995).

Besides ACEs, several covariates were associated with the outcome variables. The odds of involving penetration and those of choosing a child victim were higher for younger JSOs whereas JSOs with foreign nationalities and those with prior nonsexual delinquency had reduced odds of perpetrating against a child. Furthermore, older age and prior nonsexual delinquency appeared to be associated with elevated odds for current nonsexual convictions. These results go along with those by Aebi et al. (2012) who found that JSOs with child victims were younger and showed elevated offense severities compared to those with peer or adult victims; the latter were more often of foreign nationality and showed histories of prior and current general delinquency more frequently. Those results underscore that, in addition to ACEs, demographic and further criminal factors need to be considered in the explanation of juvenile sexual offending.

The present study has several strengths that consolidate the reliability of the results. First, findings are based on an extensive file analysis of a large sample of JSOs. Whereas most studies in the field solely rely on self-reported ACEs (Seto & Lalumière, 2010), the consideration of files that contain both self-reports and records from external sources appears fruitful to counteract biased prevalence estimations (Stoltenborgh et al., 2015). By only including files with mental health or social worker reports, a valid assessment of ACE was approximated. As prosed by other researchers (e.g., Teicher & Samson, 2016), a multiplicity of

ACEs were taken into account, and their coexistence was respected not only by building a cumulated score but by the advanced statistical person-oriented approach of LCA. As such, the number, the sorts, and specific combinations of ACEs could be examined simultaneously. Relations between ACEs and offense/victim characteristics were analyzed over and above the influence of oft-cited covariates of juvenile offending.

On the other hand, some limitations need to be considered in interpreting the results. Firstly, the availability of data for the present study was narrowed because the underlying information from the case files had not been originally collected for research purposes. The consideration of anamnestic information depended on the justice institutions' decisions to obtain respective reports. These might have been more often demanded for those cases believed to be more concerning. In fact, included JSOs differed from excluded JSOs, e.g., in terms of younger age, more severe offenses, and a higher frequency of assaults against children, male, and multiple victims. Thus, included JSO may represent a subsample of high-risk JSOs which impedes the generalizability of the present findings. The sample further consisted of JSOs with a wide age range. We cannot exclude the possibility that different subtypes may be found among JSOs more similar in age. However, subsequent analyses included age as a covariate to counteract potential biases.

Secondly, we could not test differences between JSOs and adolescents without sexual offenses because no comparison groups were available. Moreover, there are numerous other correlates of sexually coercive behavior besides ACEs, e.g., cognitive and developmental factors (G. Ryan, Leversee, & Lane, 2011), whose consideration was beyond the scope of the present study. Thus, the etiological role of ACEs in sexual offending is not clear-cut. However, the focus of the present study was to disentangle the heterogeneity of the JSO-sample itself aiming at comparing ACE-based JSO-subtypes among each other rather than contrasting them to non-JSO samples. Distinct associations of specific ACE-subtypes with current non-sexual delinquency in the present JSOs may point to somewhat different roles of ACE histories in sexual and general offending. Yet, etiological explanations with regard to derived subtypes must be understood as preliminary theoretical assumptions that need to be tested by future research that includes both JSO-subtypes and non-JSO samples, and additional influencing factors.

Thirdly, potential influences of psychopathology were not included in the present study because it was not possible to assess psychiatric diagnoses by standardized instruments. Furthermore, Cohen's kappas for two ACE-types were slightly below the threshold for substantial values, yet displaying a highly moderate, better than chance interrater agreement

(Fleiss, 1981; Landis & Koch, 1977). Lastly, even though ACEs preceded the onset of considered sexual assaults, data were assessed retrospectively impeding causal interpretations and possibly overestimating occurring associations compared to prospective designs (Leach et al., 2016).

Taken together, the present study may inspire future research on the precursors of sexual offending in juveniles. The heterogeneity of JSOs calls for the consideration of their different ACE-patterns when contrasting them to general and/or non-delinquent peers instead of treating them as a homogeneous sample (Fanniff & Kolko, 2012; Van Wijk et al., 2006). This allows testing the specific role of ACEs in the etiology of different types of juvenile sexual offending. In this, researchers need to respect the number, the sorts, and the combinations of ACEs when examining their effects on certain outcomes. Peer-related ACEs in particular deserve more attention in this regard. For a more comprehensive view on the associations of ACEs with sexual delinquency, future research may also benefit from taking into account the timing and durations of experienced adversities most preferably using longitudinal designs that also include re-offense data. Eventually, the examination of female JSO samples is needed as those may differ on certain aspects from male offenders (Oliver & Holmes, 2015).

The present study also gives rise to implications for the work with JSOs in clinical and judicial settings. As most JSOs appear highly burdened with ACEs, an extensive inquiry of various ACEs should be routinely included in anamnestic assessments. This may enable professionals to gain a better understanding of an adolescent's path to delinquency, and to implement appropriate measures. The high prevalence of ACEs and their various associations with sexual delinquency indicate that along with other influencing factors ACEs need to be considered in education and prevention programs. Still, few prevention approaches for sexual violence have included ACEs although the promotion of supporting family- and peer-relations appears beneficial in this regard (DeGue et al., 2014; Tharp et al., 2013).

Primary prevention programs may focus on reducing ACEs in the first place, both in family- and peer-contexts, e.g., broaching the issues of child maltreatment (e.g., Basile, 2003) and bullying (e.g., Bradshaw, 2015). Secondary and tertiary prevention (intervention) programs that focus on selective samples of adolescents at risk for sexual violence (e.g., former violent non-sexual offenders; Basile, 2003) and JSOs, respectively, may also benefit from considering ACEs. Multisystemic Therapy (MST), for example, has been proven an effective treatment approach for JSOs (Schmucker & Loesel, 2015). By targeting the social circle of adolescents, current family-, peer-, and school-related adversities may be reduced (Borduin,

Schaeffer, & Heiblum, 2009). However, because most JSOs suffer from ACEs that have occurred in their pasts, trauma-oriented approaches might be fruitful as well. Depending on a JSO's offense and victim characteristics, different ACEs may be given specific attention. Some efforts have been made to implement similar interventions in samples of violent adult and juvenile offenders, e.g., narrative exposure therapy for forensic offender rehabilitation (FORNET; Elbert, Hermenau, Hecker, Weierstall, & Schauer, 2012) or Trauma Adaptive Recovery Group Education and Therapy (TARGET; Ford, 2015). Their effectiveness in JSO samples is, however, yet to be proven. Still, the application of these interventions in JSO samples appears promising because they deal with risk factors for recidivism of JSOs (e.g., cognitive and affective distortions; Kenny, Keogh, & Seidler, 2001; Worling & Langton, 2015) which may be (partly) traced back to experienced adversities (Elbert et al., 2012; Ford, 2015).

3.2 Study 2: Type and timing of maltreatment influence criminal persistence in sexually abusive adolescents[5]

Reference: Barra, S., Bessler, C., Landolt, M. A., & Aebi, M. (2017c). Type and timing of maltreatment influence criminal persistence in sexually abusive adolescents. *Law and Human Behavior.* Advance online publication. https://doi.org/10.1037/lhb0000255

Abstract

The development of sexuality is a major goal in the normative course of puberty. However, some adolescents start and maintain sexually coercive behaviors. Maltreatment appears as a contributing factor in juvenile criminal persistence, although its role regarding re-offenses in juveniles convicted of sexual offenses (JSOs) is unclear. We examined time-dependent associations of maltreatment categories and subtypes with criminal persistence in JSOs. Files of 278 male JSOs (M = 14.64 years, SD = 1.58 years) were analyzed for experiences of emotional abuse, physical abuse, sexual victimization, emotional neglect, and physical neglect. We found three subtypes reflecting severe maltreatment, neglectful experiences, and low maltreatment. Severe maltreatment proved to be a consistent predictor of nonsexual criminal persistence, whereas overall neglectful experiences were related to sexual criminal persistence. More specifically, physical neglect (including lack of parental supervision) appeared of major importance for criminal persistence. Results indicate that maltreatment is a contributing factor in criminal persistence in JSOs and emphasize the potential gain of applying family-oriented interventions to reduce criminal persistence in JSOs.

Keywords: Adverse Childhood Experiences, Juvenile Sexual Offenders, Recidivism, Chronicity, Risk Assessment

Introduction

Adolescence is a time of major importance for the development of sexuality (e.g., Ellis et al., 2012). However, adolescent sexuality becomes concerning when juveniles involve others in sexual activities against their will. Recent studies found 7.1%–10.6% of male and 1.2%–5.8% of female adolescents had forced someone into unwanted sexual activities (Aebi,

[5]

Landolt, et al., 2015; Williams et al., 2014). Although the majority of sexually coercive behaviors remain unreported (Maier et al., 2013), a considerable number reach the attention of juvenile justice authorities. In 2015, about 17% of all arrests for sexual crimes (apart from prostitution) in the U.S. involved juveniles under the age of 18 years (Federal Bureau of Investigation, 2016). In Switzerland, minors were responsible for 19% of all charges for comparable sexual offenses (Swiss Federal Statistical Office, 2016).

Criminal persistence in adolescents convicted of sexual offenses

Almost half of the juveniles convicted of sexual offenses (JSOs) were found to continue criminal behaviors, with a small fraction showing repeated sexual assaults (Aebi et al., 2011; Caldwell, 2010). Given the variety of negative developmental, psychological, and social consequences for the victims of sexual violence (e.g., Fergusson et al., 2013; Landolt et al., 2016) it appears crucial to protect society from further sexual crime perpetration by JSOs. At the same time, efforts must be made to successfully reintegrate JSOs into their communities offering them a chance to develop toward a productive non-criminal future (Chaffin, 2008). Therefore, it is of major importance to gain an understanding of the factors that lead to the persistence of sexually coercive behaviors in order to tailor effective interventions and adapt respective policy proceedings.

Maltreatment and general criminal persistence

Although most victims of maltreatment do not engage in later crime perpetration, experiences of maltreatment have been repeatedly discussed in explanatory models for the onset and persistence of sexually coercive behaviors (e.g., Aebi, Landolt, et al., 2015; Mallie et al., 2011). Leeb et al. (2008) define childhood maltreatment as "any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child" (p. 11). Commission includes physical, emotional, and sexual abuse; omission refers, for example, to physical and emotional neglect. Maltreatment has been associated with a multitude of deviating, partly inter-dependent developmental outcomes in childhood, adolescence, and adulthood, e.g., abnormalities in brain structure and function, psychiatric/psychological disorders, and behavioral problems. These outcomes may, moreover, be especially influenced by the timing and chronicity of specific maltreatment types (Teicher & Samson, 2016; Thornberry et al., 2001).

A multitude of studies have related maltreatment to persistent crime in adolescents over and above the effects of prior delinquency, demographics, and several dynamic risk factors like relationship problems or substance abuse. For instance, parental neglect was found to be predictive of general recidivism (Kingree et al., 2003; van der Put & De Ruiter, 2016),

especially regarding short-term persistence of severe crime (Hoeve et al., 2008). Physical abuse was found to be predictive of ongoing violent crime in a recent study on more than 10,000 male juveniles (van der Put & De Ruiter, 2016). Considering the additive effects of various childhood adversities, Baglivio et al. (2015) as well as Fox et al. (2015) showed that an increasing number of adversity types (including maltreatment and further familial dysfunction, e.g., mentally ill family members) was positively related to the onset and persistence of adolescent delinquency. Some studies also accounted for the effects of timing and chronicity of maltreatment on adolescent delinquency: Juveniles with chronic maltreatment and adversities in adolescence (especially neglect) were found to be particularly prone to starting and maintaining criminal behaviors (J. P. Ryan et al., 2013; Stewart et al., 2008; Thornberry et al., 2001)

Maltreatment and sexual criminal persistence

Conflicting findings were reported regarding the role of maltreatment as predictor of sexual criminal persistence in JSOs. For example, the experience of sexual victimization proved to be predictive of sexual and general criminal persistence (Carpentier & Proulx, 2011; Mallie et al., 2011). Furthermore, parental refusal was found positively related to sexual reoffending (Carpentier & Proulx, 2011). In contrast, physical abuse was not found to be related to the maintenance of sexually abusive behaviors (Mallie et al., 2011). Based on their meta-analysis of 82 studies on adults and adolescents, Hanson and Morton-Bourgon (2005) found that maltreatment (e.g., parental neglect, physical, and sexual abuse) was not associated with persistent sexual crime. Hence, research on the role of maltreatment in the prediction of criminal persistence in JSOs remains inconclusive. This may be due to several factors, e.g., the low number of respective studies, their reliance on different sorts of data collection (self-reported data versus external sources), different definitions and numbers of included maltreatment types, and specific focus on single experiences without considering their coexistence (Mallie et al., 2011). Finally, we are not aware of any study that has considered the timing and chronicity of maltreatment in JSOs. Studies that counteract these limitations appear necessary.

Respecting the coexistence of maltreatment experiences

One common approach to account for the number and coexistence of various maltreatment experiences is to sum up their number (variable-centered approach; e.g., Felitti et al., 1998). A resulting maltreatment score is informative to investigate additive effects of cumulating maltreatment experiences but does not respect specific individual patterns of coex-

isting maltreatment categories (Berzenski & Yates, 2011). Thus, the need for person-centered analyses has been expressed (Thornberry et al., 2001).

Person-centered approaches like Latent Class Analysis (LCA) assign individuals to specific subtypes according to their individual patterns of coexisting maltreatment experiences. Several maltreatment subtypes were reported in underage community and offender samples. For instance, Witt et al. (2016) found three subtypes based on experiences of (1) sexual abuse; (2) multiple forms of maltreatment excluding sexual abuse; and (3) multiple forms of maltreatment including sexual abuse in a community sample of minors between 4 and 17 years. Aebi, Linhart, et al. (2015) identified three subtypes with (1) no/mild maltreatment; (2) emotional and physical maltreatment; and (3) emotion, physical, and sexual maltreatment in a juvenile prison sample. Similarly, Ford et al. (2013) found juvenile detainees assigned to a low and a moderate adversity but also a polyvictimized adversity subtype. Referring to JSOs in particular, Barra, Bessler, et al. (2017a) found two subtypes with low and high rates of childhood adversity as well as three subtypes with mainly neglectful experiences, peer-related adversity, and family-based adversity. Yet, we are not aware of any study to date that has analyzed maltreatment subtypes and their relations to criminal persistence in JSOs.

Study aims

The present study aimed to address this research gap by (1) examining subtypes of JSOs based on their specific maltreatment patterns while respecting the timing and chronicity of maltreatment; and (2) relating these findings to the incidence of sexual and nonsexual recidivism. To allow comparison with previous studies, we also analyzed single maltreatment categories and their cumulative effects. Based on the abovementioned literature, we tested the following four hypotheses: (1) We expected to find at least two distinct subtypes reflecting patterns of low and severe maltreatment, respectively; (2) we expected positive associations between the increasing number of maltreatment categories and the probabilities of sexual and nonsexual criminal persistence (dose-response relationships); (3) we expected chronic and more proximal maltreatment to exert greater effects than maltreatment in early childhood; (4) we expected neglectful experiences as well as sexual victimization to predict sexual but also nonsexual criminal persistence.

Methods

Procedures

Data were assessed through a comprehensive analysis of the case files of juveniles who had been convicted of a sexual offense (apart from offenses that only involved pornography) in the German-speaking part of Switzerland between January 2007 and September

2014. Due to particular privacy policies, participation had been disapproved by three cantonal (state-level) justice institutions responsible for 16.9% of all convictions in this time frame. The file analysis was conducted by a forensic psychologist, a forensic PhD psychology student, and a Master's student of Psychology between February and December 2015. Variables were defined through a systematic coding scheme inspired by the Forensic Psychiatric Documentation System (Nedopil et al., 1986) but adapted for the use in adolescent samples and for assessing our variables of interest (see below). Thirty case files, which had been randomly chosen under the consideration of file content (availability of psychiatric/psychological expert opinion) and dwelling area (urban vs. rural), were independently double-rated by the forensic psychologist and the forensic PhD student (raters remained uninformed about the other's coding) to assess interrater agreement. Cohen's kappa (κ) for nominal variables and the intraclass correlation coefficient (*ICC*; two-way random-based approach on single measure, absolute agreement) for metric variables indicated substantial to very good interrater agreement (≥ .61; Fleiss, 1981; Landis & Koch, 1977) for all but two variables which showed moderate, yet significant, interrater agreement (Supplement 1). The ethics committees of the canton Zurich and northwest/central Switzerland (EKNZ; lead ethics committee: Zurich, EC-No. 2010-0483) as well as all involved justice institutions had approved the study procedures.

Sample

In total, case files of 673 male (98.0%) and 14 female (2.0%) JSOs were analyzed. For the accurate assessment of the adolescents' personal and criminal backgrounds, we excluded all cases that were missing biographical reports by health care or social work professionals. The remaining 325 cases included data from three female JSOs (0.3%) which had to be excluded because their small number impeded statistical analyses. Due to the categorization of maltreatment in distinct time frames of occurrence (see below), we further trimmed the sample to 278 male JSOs who were at least 12 years old at the time of their first sexual action involved in the current conviction (M = 14.64 years, SD = 1.58 years, range = 12.00–18.50 years).

About 29.2% (n = 81) of the JSOs were of foreign nationality. Low socioeconomic status (SES) was stated for 15.1% (n = 42). No inter-dependence was found between these variables, $\chi^2(1) = 1.54$, $p = .215$, $OR = 1.56$, 95% CI [0.77, 3.14]. Whereas 4.3% (n = 12) of the JSOs had histories of prior sexual delinquency, 46.0% (n = 128) had shown further non-sexual offenses. Twenty-eight JSOs (10.1%) were currently convicted of sexual hands-off offenses only, e.g., verbal or online harassment, whereas 239 (86.0%) had conducted hands-on offenses ranging from forced touching to penetration.

Attrition analyses showed that excluded male JSOs (due to missing biographical reports and/or age below 12 years) did not differ from included JSOs in terms of age (M = 14.93, SD = 2.16), $t(669.29) = 1.68$, $p = .093$, $r = 0.06$, Mean Difference = -0.24, 95% CI [-0.53, 0.41], and low SES (n = 56, 22.1%), $\chi^2(1) = 2.48$, $p = .115$, $OR = 0.70$, 95% CI [0.45, 1.09]. Yet, a higher rate of juveniles with non-Swiss nationality was found in excluded JSOs (n = 159, 40.4%), $\chi^2(1) = 8.74$, $p = .003$, $OR = 0.61$, 95% CI [0.44, 0.85]. The current convictions of excluded JSOs included higher rates of hands-off only offenses (n = 75, 19.0%), $\chi^2(1) = 10.00$, $p = .002$, $OR = 0.48$, 95% CI [0.30, 0.76], and lower rates of hands-on offenses (n = 292, 73.9%), $\chi^2(1) = 14.23$, $p \leq .001$, $OR = 2.16$, 95% CI [1.44, 3.25].

Measures

Maltreatment. Emotional and physical abuse, sexual victimization, and emotional and physical neglect were assessed by means of the Maltreatment and Abuse Chronology of Exposure (MACE) Scale (Isele et al., 2014; Teicher & Parigger, 2015). The MACE contains categories that directly represent physical abuse, physical neglect, emotional neglect, and sexual victimization. Emotionally abusive experiences, however, are reflected by four scales named *parental verbal abuse*, *parental nonverbal emotional abuse*, *witnessing violence between parents*, and *witnessing violence towards siblings*. Following Teicher and Samson (2013), we merged those four scales into one category reflecting overall emotional abuse. We additionally referred to the Child Sexual Abuse Questionnaire (CSAQ; Mohler-Kuo et al., 2014) to include experiences of non-contact/online sexual harassment in our estimation of sexual victimization.

First, we coded the overall presence or absence of maltreatment that had occurred prior to the current offense as 0 (= *absent*) or 1 (= *present*). Second, we coded whether maltreatment had occurred during any of the following time periods as defined by prior research (Thornberry et al., 2001): early childhood (0-5 years), late childhood (6-11 years), and adolescence (12 years and older). Chronic maltreatment was assumed for JSOs with respective experiences in all three age periods.

The self-report forms of the MACE and the CSAQ have been proven valid and useful in assessing childhood adversities (Aebi, Landolt, et al., 2015; Isele et al., 2014; Mohler-Kuo et al., 2014; Teicher & Parigger, 2015). The present interrater reliability scores support the use of respective maltreatment categories in file analyses (Supplement 1).

Criminal persistence. Information on the occurrence of any criminal behavior a JSO had shown after the current conviction was drawn from the case files and from an official database provided by the Swiss Federal Office of Justice. As case files contained progress

reports from professionals involved in the JSO's course of measure (e.g., psychiatrists/psychologists, social workers, or probation officers), they also listed delinquent acts that had not necessarily led to further criminal charges. This allowed for a more accurate estimation of persistent delinquency and counteracted its potential underestimation in studies only relying on official penal records (e.g., Wolff & Baglivio, 2016). Progress reports and official records were examined after the coding of maltreatment had been completed to prevent possible bias. The JSOs' observation periods for re-offenses ranged between 1.4 and 9.4 years. A recidivism period of 1.4 years (504 days) was chosen for the current analyses because (1) it reflected the maximal observation period available for 100% of the sample; and (2) prior research has recommended to focus on short-term recidivism because the risk for reoffending appears especially high with temporal proximity to the initial offense (Caldwell, 2010; Carpentier & Proulx, 2011). Sexual criminal persistence was coded present when a JSO had shown sexually offending behavior (other than pornography) as defined by the Swiss penal code. Nonsexual criminal persistence was coded present when a JSO had shown criminal behavior without any reference to sexuality.

Covariates. A JSO's age at the first currently convicted sexual assault, foreign (non-Swiss) nationality, low SES, histories of sexual delinquency, and further general delinquency were considered as covariates due to their potential influence on criminal persistence in adolescents (e.g., Aebi et al., 2012; Kipping et al., 2015; McCann & Lussier, 2008). SES was considered low when both of the JSO's caregivers (or one in case of missing information on the other) were out-of-work or unskilled workers as categorized by the International Standard Classification of Occupations (ISCO-08) guidelines (International Labour Organization, 2012). Prior sexual delinquency was coded present when a JSO had been charged for sexual offenses before the current conviction. Further nonsexual delinquency was affirmed when a JSO had been charged for any nonsexual offenses prior to or within the current conviction.

Statistical Analyses

Analyses were conducted in Mplus 7.31 (Muthén & Muthén, 1998-2015) and SPSS 23. In order to empirically derive maltreatment subtypes, we applied LCA and Latent Transition Analysis (LTA). LTA displays an extension of LCA suitable for examining the effects of timing and chronicity of maltreatment on criminal persistence. LTA (a) assigns individuals to maltreatment subtypes at distinct measurement points; and (b) describes movements of individuals across subtypes over time (while controlling for assignments at previous time points). Both LCA and LTA diminish measurement-error due to their latent variable structure (e.g., Collins & Lanza, 2013).

Model specification. LCA and LTA were modeled according to Collins and Lanza (2013) and Nylund (2007). Robust maximum likelihood estimation was used with 800 (LCA) and 2000 (LTA) random starts ensuring the achievement of global rather than local maxima. Among models with different numbers of latent subtypes, lower values on the Akaike Information Criterion (AIC; Akaike, 1974), the Bayesian Information Criterion (BIC; Schwarz, 1978), and the sample-size adjusted Bayesian Information Criterion (aBIC; Sclove, 1987) indicated better data fit. Contrasting a model of *k* subtypes with one of *k-1* subtypes, significant results of the Bootstrapped parametric Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000) pointed to a better fit of the *k*-subtype model. Higher entropy values represented better assignments of individuals to subtypes. Model selection additionally relied on the subtypes' interpretabilities.

LCA on overall maltreatment. The five maltreatment categories (emotional abuse, physical abuse, sexual victimization, emotional neglect, and physical neglect) without consideration of the timing of their occurrence were entered into a LCA. Models with one to five latent subtypes were compared.

LTA on time-specific maltreatment. As a preliminary step, single LCAs (including emotional and physical abuse, sexual victimization, emotional and physical neglect) were run for each age-period of maltreatment. Model parameters indicated that 3-subtype solutions were most appropriate for each time period (Supplement 2). Based on this information, LTA models with two to four subtypes per time period were estimated. Models with equal and varying numbers of subtypes across time periods were considered as well as models with and without measurement invariance. Model selection was based on AIC, BIC, and aBIC under consideration of entropy and interpretability. We did not conduct BLRTs in this context because concerns have been mentioned in regard to their applicability for LTA model selection due to sparseness and the very large numbers of degrees of freedom (e.g., Collins & Lanza, 2013).

Binary logistic regressions. Relations between maltreatment and criminal persistence were examined using binary logistic regressions that included the abovementioned covariates. Multicollinearity was considered concerning when variance inflation factors (VIF) exceeded 10 and/or the tolerance values fell below .10 (Hair, Anderson, Tatham, & Black, 1995).

Results

Descriptive findings

Prevalence of maltreatment. Table 7 displays the overall and time-specific prevalence rates for the five maltreatment categories. Each maltreatment type was most prevalent during

late childhood. Emotional neglect appeared most frequently in each age period, followed by emotional abuse, physical neglect, physical abuse, and sexual victimization. With the exception of physical abuse, prevalence rates were lowest in early childhood. A number of JSOs had experienced chronic maltreatment, although only one had been exposed to chronic sexual victimization.

Rates of criminal persistence. More than one third of the sample (*n* = 96, 34.5%) showed nonsexual criminal persistence, whereas 31 (11.2%) had engaged in repeated sexual offending.

Table 7

Prevalence Rates for Overall, Time-Specific, and Chronic Maltreatment

Maltreatment	Overall		Timing of occurrence									
			Early childhood		Late childhood		Adolescence		Chronic		Missing	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Emotional abuse	120	43.2	71	25.5	98	35.3	82	29.5	43	15.5	0	0.0
Physical abuse	79	28.4	49	17.6	61	21.9	46	16.5	26	9.4	8	2.9
Sexual victimization	31	11.2	8	2.9	19	6.8	10	3.6	1	0.4	2	0.7
Emotional neglect	162	58.3	106	38.1	135	48.6	137	49.3	84	30.2	7	2.5
Physical neglect	105	37.8	59	21.2	78	28.1	68	24.5	32	11.5	3	1.1

Note. *N* = 278. Missings for the age-related categorizations of maltreatment resulted when general information on the overall occurrence was available but not on the timing of maltreatment.

Subtypes based on overall maltreatment

Among the competing LCA-models, the 3-subtype model was chosen because it was favored by the AIC and aBIC as well as the BLRT, and it also assigned individuals well to meaningful subtypes (Supplement 2). Half of the JSOs (*n* = 139, 50.0%) had low probabilities of endorsing any maltreatment category, whereas about one quarter (*n* = 67, 24.1%) were most likely to have experienced emotional and physical neglect, and a further quarter (*n* = 72, 25.9%) were likely to have experienced emotional and physical abuse on top of emotional

and physical neglect. Thus, we labeled the subtypes “low maltreatment”, “neglectful experiences”, and “severe maltreatment”, respectively (Figure 9).

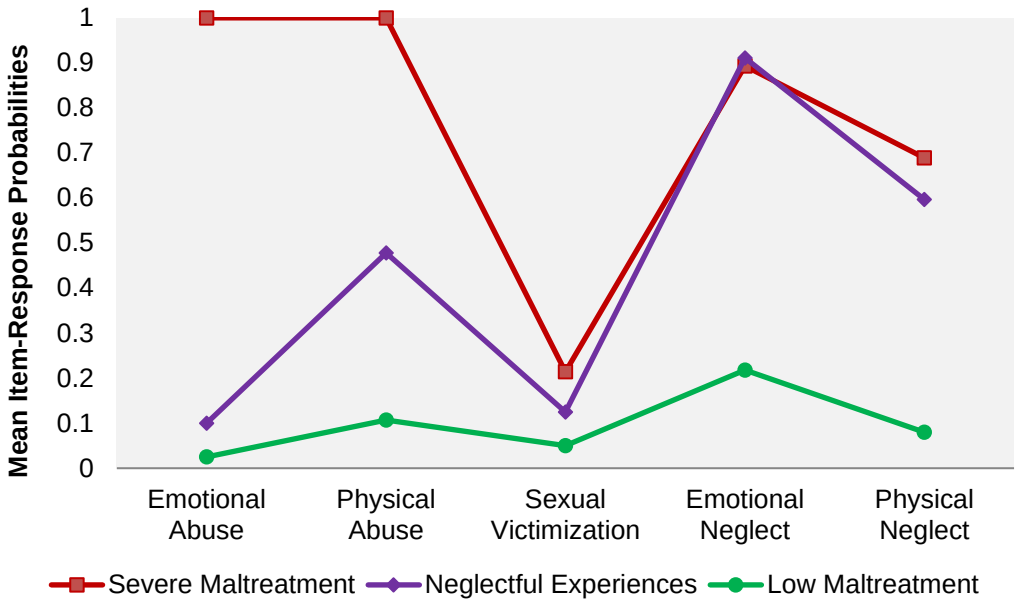

Figure 9. Subtypes based on mean item-response probabilities for Latent Class Analysis on overall maltreatment.

Subtypes based on time-specific maltreatment

The measurement-invariant 3-subtype LTA model fitted the data best and showed clear subtype assignments (see Supplement 3). A model which included second-order transitions (i.e., transitions from early childhood to adolescence) showed higher AIC (3186.07), BIC (3309.41), and aBIC (3201.60) values than the present model which only including first-order transitions (i.e., transition from one to the subsequent measurement point). Thus, the model with first-order transitions only was chosen for further analyses. In terms of statistical power, the sample of 278 JSOs appeared adequate for the estimation of the 29 parameters (two class prevalences, 12 transition probabilities, and 15 item-response probabilities) in the 3-subtype model (e.g., Muthén & Muthén, 2002).

Thus, both preliminary LCAs and the final LTA supported the finding of three latent maltreatment subtypes over time. Based on their patterns of maltreatment experiences, LTA subtypes were labeled similarly to LCA subtypes as “low maltreatment”, “neglectful experiences”, and “severe maltreatment” (Figure 10).

Figure 11 displays the time-specific prevalence rates for each subtype and transition rates between subtypes over time. LTA revealed a total of 27 patterns of subtype transitions across the three time periods. Overall, subtype affiliations appeared to be relatively stable.

Many JSOs remained in the same subtype over all three time periods with 43.2% (*n* = 120) in the low maltreatment, 15.5% (*n* = 43) in the neglectful experiences, and 14.75% (*n* = 41) in the severe maltreatment subtype.

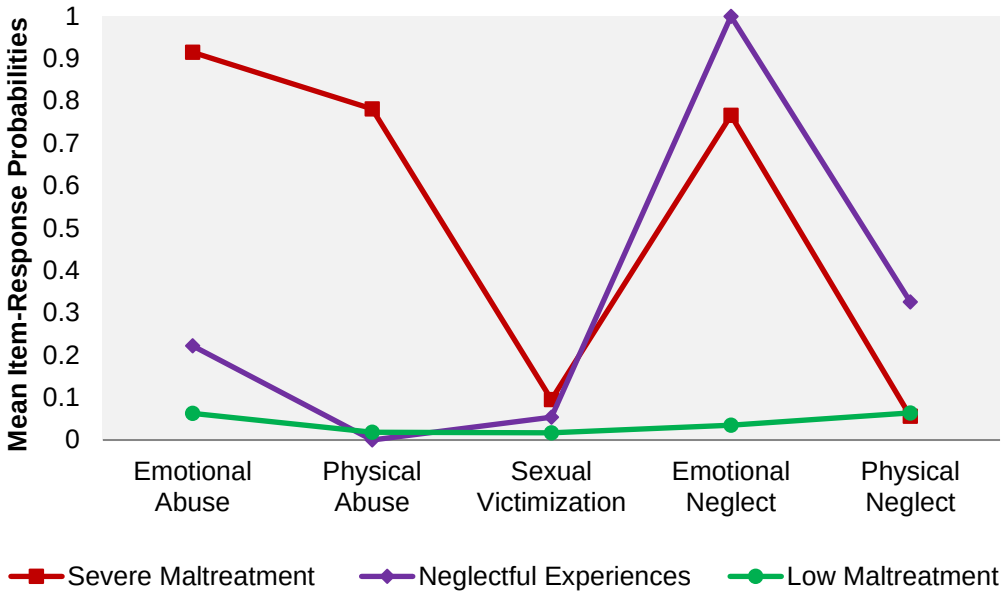

Figure 10. Subtypes based on mean item-response probabilities for Latent Transition Analysis.

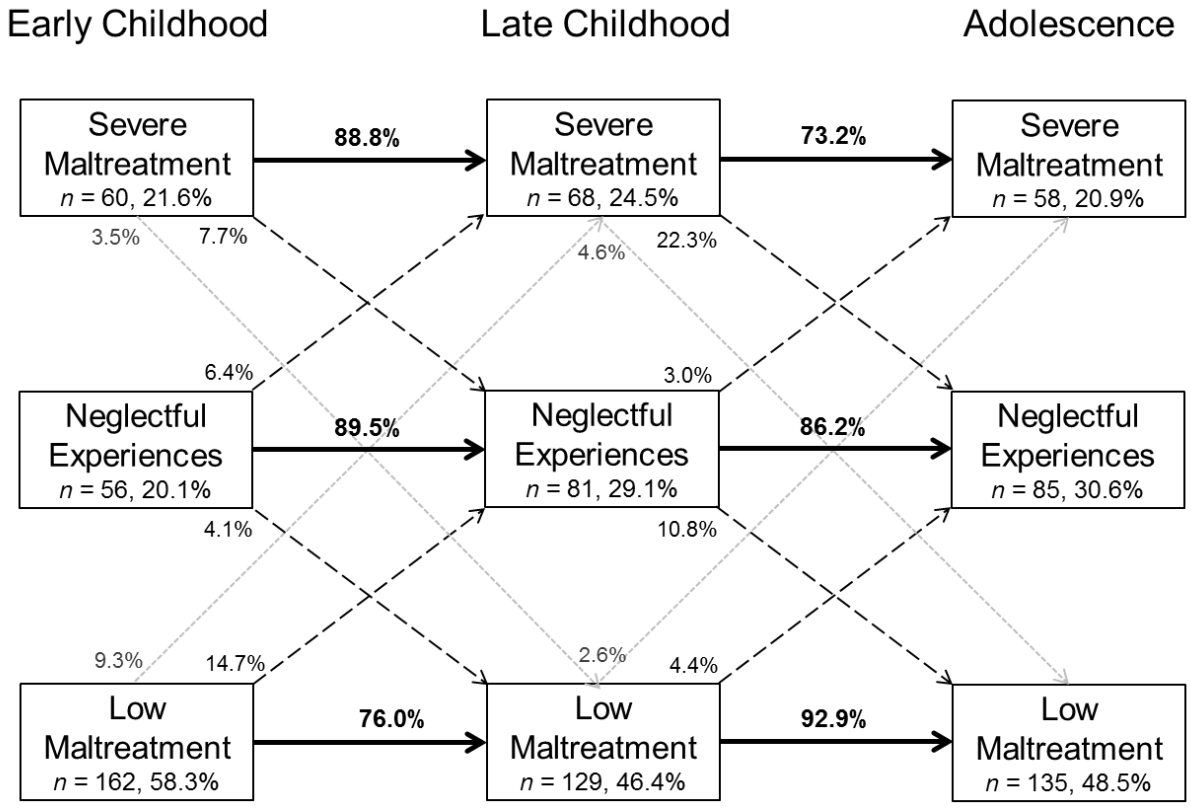

Figure 11. Prevalence rates of subtypes and transitions between subtypes across the three time periods.

Associations of maltreatment and criminal persistence

Binary logistic regressions were run free of multicollinearity issues. Results of the regressions including LCA and LTA subtypes are presented in Table 8. Results for analyses including single maltreatment categories and the cumulative maltreatment score are displayed in Table 9.

Maltreatment and nonsexual criminal persistence. Nonsexual criminal persistence was associated with the severe maltreatment-subtype irrespective of its timing. Effects remained significant when accounting for previous affiliations to the neglectful-experiences subtype but not if JSOs had previously belonged to the severe maltreatment-subtype. Moreover, nonsexual criminal persistence was related to overall, but not to any time-specific neglectful experiences-subtypes.

Concerning single maltreatment categories, nonsexual criminal persistence was associated with overall physical neglect as well as physical neglect during late childhood, adolescence, or chronically. Additionally, nonsexual criminal persistence showed a significant relation to adolescent emotional abuse. When all time-dependent maltreatment categories with significant relations to nonsexual criminal persistence were concertedly included in a subsequent regression analysis, only adolescent physical neglect remained significant, p = .026, OR = 2.72, 95% CI [1.13, 6.55]. The cumulative maltreatment score was positively related to nonsexual criminal persistence independent of timing. Controlling for the number of maltreatment experiences in early childhood, both cumulative scores from late childhood and adolescence remained significant, p = .002, OR = 1.52, 95% CI [1.17, 1.97], and p = .001, OR = 1.59, 95% CI [1.21, 2.08], respectively. Controlling for each other, cumulative scores from late childhood and adolescence did not show significant effects, p = .109, OR = 1.27, 95% CI [0.95, 1.69], and p = .071, OR = 1.37, 95% CI [0.97, 1.92].

Maltreatment and sexual criminal persistence. Sexual criminal persistence was associated with the overall neglectful experiences-subtype. Sexual criminal persistence was further related to overall physical neglect, physical neglect experienced in late childhood, and sexual victimization in adolescence. The cumulative maltreatment score was positively associated with sexual criminal persistence only for the adolescent time period. Controlling for each other in a subsequent regression analysis, the effect of late childhood physical neglect remained significant, p = .046, OR = 2.04, 95% CI [1.02, 5.69], whereas the effect of adolescent sexual victimization became insignificant, p = .105, OR = 3.50, 95% CI [0.77, 15.97]. Late childhood physical neglect and the adolescent cumulative maltreatment score became

insignificant when simultaneously analyzed, $p = .159$, $OR = 2.03$, 95% CI [0.76, 5.46], and $p = .169$, $OR = 1.32$, 95% CI [0.89, 1.94], respectively.

Further exploratory analyses. Because physical neglect appeared to play a prominent role in criminal persistence, we were curious about the composition of this variable in the present sample. The MACE describes physical neglect by five items. Overall, the item "insufficient supervision" was affirmed in 99% ($n = 104$) of the JSOs with physical neglect, followed by "had to wear dirty clothes" ($n = 15$, 14.3%), "unprotective family members" ($n = 14$, 13.3%), "insufficient medical care" ($n = 10$, 9.5%), and "insufficient food" ($n = 8$, 7.6%). Equally, "insufficient supervision" was most frequently present in early childhood ($n = 55$, 93.2%), late childhood ($n = 75$, 97.4%), adolescent ($n = 66$, 98.5%), and chronic physical neglect ($n = 30$, 93.8%).

Discussion

The present study highlights the importance of considering the types and the timing of maltreatment when examining criminal persistence in JSOs. Our findings emphasize that (1) a considerable number of JSOs show histories of multiple maltreatment experiences; (2) severe maltreatment represents a serious risk factor for criminal persistence independent of its timing of occurrence; and (3) especially enduring maltreatment may exert disadvantageous effects on nonsexual and sexual recidivism risks, with particular importance attached to the lack of parental supervision.

The prevalence of maltreatment in JSOs

Rates of maltreatment were found to be increased in JSOs compared to other juvenile offender samples (Baglivio et al., 2014). Maltreatment appeared to be most prevalent during late childhood. Stewart et al. (2008) related elevated rates of maltreatment during equivalent time periods to enhanced intra-familial stress levels due to the timing of school transitions. As expected, we found two subtypes with low and high frequencies of maltreatment, and one additional subtype with mainly neglectful experiences. Our subtypes reflect that experiences from various maltreatment categories usually coexist.

The relation of maltreatment to criminal persistence

From an evolutionary point of view, Ellis et al. (2012) describe adolescence as a time-period particularly susceptible to adverse experiences. They propose that adolescents may engage in deviant harmful behaviors in stressful, uncontrollable contexts as an adaptive strategy to maintain their own fitness, represented by, e.g., social dominance and the ability to reproduce. Thus, maltreated juveniles may be especially prone to conduct risky behaviors that lead to a fast satisfaction of these needs (e.g., by engaging in sexually abusive behavior) des-

Table 8

Binary Logistic Regressions for the Relations of LCA and LTA Subtypes to Nonsexual and Sexual Criminal Persistence

Indicators	Nonsexual criminal persistence									Sexual criminal persistence								
	Model 1			Model 2[a]			Model 3[b]			Model 1			Model 2[a]			Model 3[b]		
		95% CI			95% CI			95% CI			95% CI			95% CI			95% CI	
	OR	*LL*	*UL*	*OR*	*LL*	*UL*	*OR*	*LL*	*UL*	*OR*	*LL*	*UL*	*OR*	*LL*	*UL*	*OR*	*LL*	*UL*
LCA subtype																		
Neglectful experiences	2.46*	1.22	4.96							3.20*	1.25	8.20						
Severe maltreatment	2.94**	1.47	5.89							0.83	0.26	2.60						
LTA subtype																		
Early Childhood																		
Neglectful experiences	1.10	0.54	2.25							0.91	0.33	2.53						
Severe maltreatment	2.16*	1.09	4.27							0.43	0.14	1.31						
Late Childhood																		
Neglectful experiences	1.62	0.83	3.17	2.25	0.92	5.49	1.62	0.84	3.17	1.11	0.44	2.82	1.20	0.35	4.11	1.11	0.44	2.83
Severe maltreatment	2.62**	1.29	5.33	2.71**	1.33	5.53	1.97	0.66	5.91	0.64	0.22	1.86	0.64	0.22	1.87	1.49	0.30	7.36
Adolescence																		
Neglectful experiences	1.67	0.87	3.21	1.74	0.69	4.38	1.59	0.82	3.09	1.82	0.72	4.56	2.25	0.64	7.87	2.02	0.79	5.14
Severe maltreatment	2.57*	1.24	5.33	2.57**	1.24	5.32	1.86	0.63	5.47	1.01	0.33	3.08	1.00	0.33	3.05	2.09	0.41	10.54
Chronic																		
Neglectful experiences	1.38	0.58	3.27							1.85	0.60	5.72						
Severe maltreatment	3.77**	1.50	9.46							1.22	0.33	4.43						

Note. The low-maltreatment subtypes served as reference groups. Analyses include age at the first currently convicted sexual assault, foreign nationality, low socioeconomic status, prior sexual delinquency, and further general delinquency as covariates. *OR* = odds ratio, CI = confidence interval, *LL* = lower limit, *UL* = upper limit.
[a]controlled for affiliation to the neglectful-experiences subtype at previous time point. [b]controlled for affiliation to the severe-maltreatment subtype at previous time point.
*$p < .05$, **$p < .01$.

Table 9

Binary Logistic Regressions for the Relations of Single Maltreatment Categories and the Cumulative Maltreatment Score for Nonsexual and Sexual Criminal Persistence

Indicators	Nonsexual criminal persistence			Sexual criminal persistence		
		95% CI			95% CI	
	OR	*LL*	*UL*	*OR*	*LL*	*UL*
Overall						
Emotional abuse	1.41	0.67	2.99	1.32	0.47	3.73
Physical abuse	1.27	0.60	2.71	0.39	0.13	1.20
Sexual victimization	1.53	0.65	3.58	1.24	0.37	4.20
Emotional Neglect	1.28	0.65	2.52	1.00	0.37	2.69
Physical Neglect	2.02*	1.06	3.85	2.53^{+}	0.98	6.56
Cumulative maltreatment	1.46***	1.21	1.76	1.09	0.84	1.42
Early childhood						
Emotional abuse	1.08	0.44	2.69	0.45	0.11	1.90
Physical abuse	2.07	0.73	5.43	1.31	0.31	5.51
Sexual victimization	0.40	0.06	2.51	-	-	-
Emotional Neglect	0.98	0.50	1.94	1.28	0.50	3.31
Physical Neglect	1.73	0.78	3.81	1.24	0.40	3.80
Cumulative maltreatment	1.28*	1.05	1.56	0.91	0.69	1.23
Late Childhood						
Emotional abuse	1.24	0.58	2.67	1.58	0.56	4.43
Physical abuse	1.42	0.65	3.11	0.37	0.11	1.18
Sexual victimization	2.83^{+}	1.00	8.03	0.75	0.15	3.74
Emotional Neglect	1.04	0.53	2.07	0.71	0.25	2.00
Physical Neglect	2.70**	1.32	5.51	3.97**	1.41	11.16
Cumulative maltreatment	1.52***	1.23	1.87	1.12	0.84	1.48
Adolescence						
Emotional abuse	2.15*	1.01	4.56	2.30	0.84	6.30
Physical abuse	0.77	0.32	1.87	0.46	0.14	1.52
Sexual victimization	2.92	0.68	12.45	4.88*	1.02	23.45
Emotional Neglect	1.17	0.62	2.22	1.54	0.58	4.08
Physical Neglect	3.52***	1.74	7.11	2.03	0.76	5.46
Cumulative maltreatment	1.66***	1.29	2.13	1.49*	1.06	2.12
Chronic						
Emotional abuse	1.27	0.48	3.37	0.95	0.25	3.61
Physical abuse	1.15	0.37	3.54	1.13	0.26	4.85
Sexual victimization	-	-	-	-	-	-
Emotional Neglect	0.96	0.49	1.87	1.12	0.40	2.96
Physical Neglect	3.77**	1.47	9.71	1.28	0.37	4.41

Note. Analyses include age at the first currently convicted sexual assault, foreign nationality, low socioeconomic status, prior sexual delinquency, and further general delinquency as covariates. No results were available for effects of early childhood sexual victimization on sexual criminal persistence and chronic sexual victimization on nonsexual and sexual persistence due to limited sample sizes (n = 1). *OR* = odds ratio, CI = confidence interval, *LL* = lower limit, *UL* = upper limit.

$^{+}p < .10$, *$p < .05$, **$p < .01$, ***$p \leq .001$.

pite negative consequences in the long run. Similarly, Agnew's (1992) *general strain theory of crime and delinquency* assumes that juvenile delinquency may represent one possible outcome in order to channel distress (strain). Distress may not only be due to inhibited achievement of desired goals (as supposed by previous versions of strain theory, e.g., Merton, 1938), but rather to the overall existence of negative factors in social relationships that juveniles cannot avoid (e.g., maltreatment). In addition to the effects of situational distress, chronic negative experiences, e.g., long-term (severe) maltreatment, may predispose a juvenile for crime engagement by contributing to a steady vulnerability, e.g., by impeding his ability to develop adequate coping strategies.

The present results support the abovementioned theoretical assumptions and go along with a life-course perspective which highlights the effects of enduring maltreatment on antisocial behavior tendencies in adolescents (Elder, 1998; Ireland, Smith, & Thornberry, 2002).

Nonsexual criminal persistence. We found severe/cumulative maltreatment to represent a serious stressor independent of its timing. Chronic severe maltreatment was attended by more than tripled odds for nonsexual criminal persistence, which underscores the detrimental effects of long-term maltreatment on adolescent delinquency found in previous studies (e.g., Thornberry et al., 2001). Equally, the dose-response relationship between the number of experienced maltreatment categories and recidivism risk highlighted that nonsexual criminal persistence is particularly likely in highly burdened adolescents (e.g., Baglivio et al., 2014).

The present results further underscore the outstanding role of physical neglect in juvenile nonsexual criminal persistence. The influence of physical neglect is not only shown by our examination of single maltreatment categories but also by the finding that the LCA but not any of the LTA neglectful-experiences subtypes was associated with the risk of nonsexual criminal persistence, which may be due to the fact that the LCA neglectful experiences-subtype showed greater probabilities for physical neglect compared to the LTA neglectful experiences-subtypes. J. P. Ryan et al. (2013) explain the significance of neglect in consistent adolescent delinquency referring to insufficient parental supervision as a "critical component of neglect" (p. 455). They propose that the lack of supervision in adolescence may serve as an expression of general intra-familial relationship problems, which may enhance the probability of juvenile criminal conduct. In fact, our additional analyses indicated that physical neglect may be best conceptualized as insufficient supervision in the present study.

Taken together, our results support previous findings from juvenile offender samples indicating that enduring physical neglect has a crucial impact on persistent nonsexual crime (J. P. Ryan et al., 2013; Stewart et al., 2008; Thornberry et al., 2001).

Sexual criminal persistence. Exposure to sexual victimization was related to later perpetration of sexual coercion when it had occurred during adolescence. This finding contributes to prior research that has emphasized the role of sexual victimization in sexual reoffending (Carpentier & Proulx, 2011; Mallie et al., 2011). Yet, large confidence intervals, which may partly reflect an artifact of possible underreporting of sexual victimization in the present case files (Stoltenborgh et al., 2015), underscore that the effect of adolescent sexual victimization on sexual recidivism must be interpreted with caution and needs further investigation in other samples. However, similar to nonsexual criminal persistence, sexual criminal persistence was related to the overall neglectful experiences-subtype as well as to physical neglect (by trend). Physical neglect in late childhood even exerted significant predictive effects above the experiences of sexual victimization in adolescence. Our findings further indicate that late childhood physical neglect and the cumulative amount of different maltreatment types experienced during adolescence may have some shared influence on the maintenance of sexually coercive behavior.

Taking into account the assumption of a steady vulnerability (e.g., Marshall, 1989; Marshall, 1993; Thornton & D'Orazio, 2016), childhood experiences of neglect (e.g., interfering with the development of self-esteem, emotion regulation, and social cognition) may be linked to an individual's incapacity to establish close relationships to satisfy intimacy needs. This type of steady vulnerability may remain unremarkable for a certain amount of time. However, in combination with elevated pubertal sexual desires, the urge to satisfy intimate (sexual) needs may become salient when an adolescent is exposed to further triggering stressful experiences, thus enhancing the probability of commencing or repeating sexually coercive behavior.

Limitations

Our findings have to be interpreted under consideration of several qualifications. First, caution is suggested when interpreting the effects of the timing of maltreatment on criminal persistence. Subsamples of JSOs who had exclusively experienced maltreatment at particular age periods were too small for reliable statistical analyses. Consequently, there was a considerable overlap of juveniles in time-dependent maltreatment categories and subtypes (e.g., illustrated by the stability of subtype assignments). Implementing statistical control in multivariate regression models did, indeed, hold the effects of maltreatment experienced at differ-

ent age periods constant, but it did not exclude the existence of these influences in the first place. Thus, our findings restrict the interpretation of any time-dependent relations between maltreatment and criminal persistence as specific for a certain age period, but rather suggest that maltreatment at different age periods may exert cumulative or shared effects on criminal persistence.

Furthermore, it cannot be ruled out that proximal maltreatment may exert greater effects on adolescent behavior because early experiences may have become weaker over time, or because juveniles may have received appropriate interventions to overcome early adversity (Thornberry et al., 2001). We were not able to include information on the interventions the adolescents may have received before or after their sexual assaults, although these may have influenced the probability of recidivism (Worling & Långström, 2003). Further risk factors, such as psychiatric diagnoses (e.g., Aebi, Linhart, et al., 2015) or histories of substance use (e.g., J. P. Ryan et al., 2013) may have influenced our findings as well but their inclusion was beyond the scope of the present study. Moreover, recent findings from adult offenders indicated that childhood maltreatment, especially neglect, may influence criminal persistence over and above the effects of psychiatric disorders (E. Y. Kim, Park, & Kim, 2016). Although we followed recommendations to include self-reported data as well as external reports in order to prevent the underestimation of maltreatment (Stoltenborgh et al., 2015), we cannot exclude the possibility that some experiences, especially in early childhood, may have remained unreported (Hardt & Rutter, 2004). Equally, despite our examination of registered and unofficial re-offenses, some crimes may not have been identified (Maier et al., 2013). Both led to reduction in statistical power when analyzing subsamples, e.g., concerning the effect of sexual victimization on sexual reoffending. Yet, the present rates of sexual re-offenses exceeded those previously mentioned in Swiss and international samples (Aebi et al., 2011; Caldwell, 2010) indicating a certain approximation towards the actual prevalence in the dark field. Furthermore, we included criminal persistence as binary variable instead of using cumulative re-offense rates in order not to inflate the complexity of our analyses which would have required enhanced statistical power. Eventually, the case files used to extract our variables of interest had not been originally prepared for research purposes. Thus, information on particular variables was narrowed (reflected by moderate, yet significant interrater agreement).

Because our study design did not include a comparison group of juveniles without sexually coercive behavior, any causal conclusions are restricted. However, findings may offer a framework for the development of potentially causal hypotheses. Eventually, despite

the large size of our sample, we only assessed data from adolescents who were living in Switzerland. Thus, the generalizability of our findings to other countries is limited. Moreover, the juveniles in our sample had conducted more severe offenses compared to those who had to be excluded, thus representing a rather high-risk sample.

Future directions for research and practice

Our results underscore the importance of taking the timing and chronicity of maltreatment into account when examining its potential effects on criminal persistence. Investigating both categories and specific subtypes of maltreatment appeared beneficial in the present study: Whereas subtypes respected the coexistence of multiple maltreatment experiences and their mutually dependent effects, the examination of single maltreatment categories appeared fruitful for the generation of further hypotheses regarding their distinct and shared effects. Future research my further benefit from including greater numbers of JSOs in subtyping approaches to allow for a more detailed investigation of how particular patterns of change among maltreatment subtypes over time may influence criminal persistence.

The present findings emphasize that interventions aimed at reducing criminal persistence in JSOs need to consider their maltreatment experiences. In fact, the comprehensive consideration of their developmental history (including maltreatment and other adverse experiences) in social, juridical, and therapeutic settings has been claimed (Creeden, 2013). Recent research highlights the challenges but also the effectiveness of implementing trauma-focused treatment approaches with adolescents involved in the justice system (Ford, Kerig, Desai, & Feierman, 2016), such as Trauma Affect Regulation: Guide for Education and Therapy (TARGET; Ford, 2015), Trauma and Grief Components Therapy for Adolescents (TGCTA; Layne et al., 2008), or Cognitive Processing Therapy (CPT; e.g., Ahrens & Rexford, 2002).

Most notably, chronic maltreatment and ongoing neglect (particularly the lack of parental supervision) should be brought into focus. Family-based interventions that counteract neglectful parenting have been considered effective in the prevention and treatment of concerning sexual behaviors in juveniles (Yoder, Hansen, Lobanov-Rostovsky, & Ruch, 2015). Adequate parental supervision, for instance, has been found to be protective of sexual risk behavior in male adolescents (Kincaid, Jones, Sterrett, & McKee, 2012). Moreover, our findings may illuminate one factor that could contribute to the promising effectiveness of Multisystemic Therapy (MST) for JSOs (Borduin et al., 2009; Dopp, Borduin, Rothman, & Letourneau, 2016; B. Kim, Benekos, & Merlo, 2016; Schmucker & Loesel, 2015): In order to reduce juveniles' behavior problems, MST mainly addresses the promotion and stabilization

of effective parenting skills needed to provide a supportive environment for them, both family- and community-based.

In conclusion, the present study may motivate researchers and clinicians to broach the issue of maltreatment and its timing in their work with JSOs. Policy makers may be informed that, according to our findings, therapeutic measures which include the juveniles' parents appear to be beneficial in reducing criminal persistence.

Supplements

Supplement 1

Interrater Reliability for All Variables Used in the Present Study

Variable	κ / *ICC*	95% CI	
		LL	*UL*
Maltreatment			
emotional abuse	.53**	.22	.83
early childhood	.66***	.36	.96
late childhood	.63***	.35	.91
adolescence	.68***	.40	.96
physical abuse	1.00***	1.00	1.00
early childhood	1.00***	1.00	1.00
late childhood	1.00***	1.00	1.00
adolescence	.89***	.68	1.00
sexual victimization	1.00***	1.00	1.00
early childhood	1.00***	1.00	1.00
late childhood	1.00***	1.00	1.00
adolescence	1.00***	1.00	1.00
emotional neglect	.80***	.55	1.00
early childhood	.68***	.44	.93
late childhood	.72***	.47	.97
adolescence	.52**	.21	.83
physical neglect	.72***	.48	.97
early childhood	.77***	.52	1.00
late childhood	.78***	.55	1.00
adolescence	.66***	.39	.93
cumulative maltreatment score	.91***	.81	.95
early childhood	.87***	.74	.94
late childhood	.90***	.79	.95
adolescence	.76***	.54	.88
Sexual criminal persistence			
based on case files	.76***	.45	1.00
based on official registry	1.00***	1.00	1.00
Nonsexual criminal persistence			
based on case files	.73***	.49	.97
based on official registry	.92***	.76	1.00
Covariates			
Age	.90***	.80	.95
foreign nationality	1.00***	1.00	1.00
low socioeconomic status	.79***	.52	1.00
history of sexual delinquency	1.00***	1.00	1.00
further general delinquency	.73***	.49	.97

Note. $N = 30$. κ = Cohen's kappa, *ICC* = intraclass correlation coefficient (*ICC*; two-way random-based approach on single measure, absolute agreement), CI = confidence interval, *LL* = lower limit, *UL* = upper limit. ***$p \leq .001$, ** $p \leq .010$.

Supplement 2

Model Comparisons Among 1- to 5-Subtype LCAs for Overall Maltreatment, Early Childhood Maltreatment, Late Childhood Maltreatment, and Adolescent Maltreatment

	Maltreatment timing	Number of subtypes				
		1	2	3	4	5
AIC	overall	1662.77	1441.06	1432.50	1440.82	1448.79
	early childhood	1302.79	1078.07	1063.73	1064.35	1073.25
	late childhood	1501.39	1319.66	1313.55	1318.53	1325.32
	adolescence	1363.00	1258.74	1255.90	1257.29	1267.05
BIC	overall	1680.91	1480.96	1494.17	1524.26	1553.99
	early childhood	1320.92	1117.97	1125.40	1147.79	1178.46
	late childhood	1519.53	1359.56	1375.22	1401.96	1430.52
	adolescence	1381.14	1298.64	1317.57	1340.73	1372.25
aBIC	overall	1665.05	1446.08	1440.26	1451.33	1462.03
	early childhood	1305.07	1083.09	1071.50	1074.86	1086.50
	late childhood	1503.67	1324.68	1321.31	1329.03	1338.56
	adolescence	1365.28	1263.76	1263.67	1267.80	1280.29
p(BLRT)	overall	-	0	0	1.00	1.00
	early childhood		0	0	.11	.67
	late childhood		0	0	1.00	.33
	adolescence		0	.01	.05	.67
Entropy	overall	-	.80	.76	.85	.76
	early childhood		.88	.95	.93	.90
	late childhood		.75	.78	.88	.81
	adolescence		.76	.83	.85	.87

Note. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, aBIC = sample-size adjusted Bayesian Infomation Criterion, BLRT = Bootstrapped parametric Likelihood Ratio Test.

Supplement 3

Fit Indices and Entropy Values for LTA-Models With Differing Numbers of Subtypes per Measurement Point With and Without Measurement Invariance

Number of subtypes				Fit indices			
Early child-hood	Late child-hood	Adolescence	Measurement invariance	AIC	BIC	aBIC	Entropy
2	2	2	no[a]	3411.06	3538.03	3427.02	.90
			yes	3407.90	3462.32	3414.75	.87
2	2	3	no[a]	3389.80	3542.16	3408.99	.88
			yes[a]	3383.71	3499.79	3398.32	.90
2	2	4	no[a]	3390.32	3568.07	3412.70	.91
			yes[a]	3383.27	3524.74	3401.08	.90
2	3	2	no[a]	3387.61	3543.60	3407.25	.90
			yes	3402.93	3522.64	3418.01	.85
2	3	3	no[a]	3281.48	3466.49	3304.77	.93
			yes	3271.37	3401.97	3287.81	.90
2	3	4	no[a]	3281.48	3495.51	3308.42	.93
			yes	-	-	-	-
2	4	3	no[a]	3276.66	3494.31	3304.06	.94
			yes	-	-	-	.
2	4	4	no[a]	3232.87	3483.18	3264.39	.93
			yes[a]	3211.25	3389.00	3233.63	.93
3	2	2	no[a]	3394.29	3546.65	3413.47	.87
			yes[a]	3389.36	3505.45	3403.98	.85
3	2	3	no[a]	3360.28	3538.03	3382.66	.91
			yes[a]	3362.89	3486.23	3378.42	.87
3	2	4	no[a]	3361.58	3564.73	3387.16	.91
			yes	-	-	-	-
3	3	2	no[a]	3301.88	3486.88	3325.17	.91
			yes[a]	3295.64	3426.23	3312.08	.91
3	3	3	no[a]	3198.69	3412.72	3225.64	.92
			yes	3182.40	3287.60	3195.50	.91
3	3	4	no[a]	3194.14	3437.19	3224.74	.93
			yes[a]	3184.45	3373.09	3208.20	.95
3	4	2	no[a]	3307.13	3524.79	3334.54	.90
			yes	-	-	-	-
3	4	3	no[a]	3200.55	3450.86	3232.06	.93
			yes[a]	3193.93	3389.82	3218.59	.91
3	4	4	no[a]	3153.26	3436.18	3188.85	.93
			yes[a]	3138.83	3348.79	3164.87	.93
4	2	2	no[a]	3383.40	3561.16	3405.78	.87
			yes[a]	3378.60	3520.08	3396.41	.85
4	2	3	no[a]	3358.47	3561.62	3384.05	.92
			yes	-	-	-	-
4	2	4	no[a]	3360.45	3588.99	3389.22	.92
			yes[a]	3356.05	3512.04	3375.67	.89
4	3	2	no[a]	3290.65	3504.68	3317.60	.91
			yes	-	-	-	-
4	3	3	no[a]	3189.20	3432.25	3219.80	.91
			yes[a]	3180.52	3369.16	3204.27	.92
4	3	4	no[a]	3186.14	3458.21	3220.40	.92
			yes[a]	3178.75	3378.27	3203.87	.91
4	4	2	no[a]	3276.94	3527.24	3308.45	.95
			yes[a]	3269.05	3446.80	3291.43	.90
4	4	3	no[a]	3173.16	3456.12	3208.79	.92
			yes[a]	3160.86	3371.26	3187.35	.92
4	4	4	no[a]	3127.04	3442.64	3166.78	.93
			yes[a]	3090.95	3261.45	3112.42	.92

Note. Measurement invariance was implied when at least two measurement points showed equal numbers of subtypes. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, aBIC = sample-size adjusted Bayesian Information Criterion.

[a] Further parameter fixation was required for model identification.

3.3 Study 3: Criminal persistence and psychosocial adversity in empirically derived offense-related subtypes of sexually abusive adolescents

Reference: Barra, S., Mokros, A., Landolt, M. A., Bessler, C., & Aebi, M. (2017). *Criminal persistence and psychosocial adversity in empirically derived offense-related subtypes of sexually abusive adolescents.* Manuscript submitted for publication.

Abstract

The very heterogeneity which characterizes the sample of juveniles who have shown sexually offending behavior (JSOs) makes it difficult to draw conclusions about the risk of these individuals becoming persistent offenders. Considering different JSO-subtypes appears to be a promising approach to intervention and prevention that meets the individual needs of these adolescents and reduces their risk of criminal recidivism. Using Latent Class Analysis, the present study is the first to empirically derive four distinct JSO-subtypes based on 10 offense/victim characteristics in a comprehensive sample of 670 JSOs (M_{age} = 14.49, SD_{age} = 1.94). A severe peer/adult-offender subtype (22.4%), a child-offender subtype (30.1%), a touch-offender subtype (27.9%), and a verbal/online-offender subtype (19.6%) were identified. Cox regressions indicated that compared to the verbal/online-offender subtype, JSOs of the severe peer/adult-offender subtype were at increased risk of sexual and nonsexual criminal persistence, whereas JSOs of the child-offender subtype tended to more likely become sexual reoffenders. In addition, these two subtypes were more burdened with psychosocial adversity than the touch- and verbal/online-offender subtypes. Our findings show that the variety of offense characteristics, predispositions, and recidivism risks characterizing JSOs deserve precise consideration to allow the implementation of effective, individually tailored treatment and prevention approaches aimed at reducing future crime.

Keywords: juvenile sexual offender, developmental adversity, offense characteristics, latent class analysis, criminal recidivism

Introduction

Sexually coercive behavior in adolescence is a matter of major public concern. Official statistics from the U.S. and Switzerland indicate that in 2015, approximately one in five sexual offenses (excluding prostitution) was committed by an individual under 18 years of age (Federal Bureau of Investigation, 2016; Swiss Federal Statistical Office, 2016) – excluding the potential dark figure of unreported cases (Maier et al., 2013). According to recent

studies, almost 50% of juveniles who showed sexually offending behavior (JSOs) continued to engage in general criminal conduct, whereas about 3% to 5% committed further sexual offenses (Aebi et al., 2011; Caldwell, 2016).

A major goal of professionals working with JSOs is to ensure that sexually abusive adolescents do not become persistent offenders. Understanding what leads minors to engage in sexually abusive behavior as well as the factors contributing to criminal persistence is essential for planning clinical interventions and preventive policy (Chaffin, 2008). Nevertheless, the heterogeneity of JSOs makes it difficult to draw conclusions about pathways that may predispose JSOs to engage in (persistent) sexual coercion (Andrade et al., 2006; Fanniff & Kimonis, 2014; Van Wijk et al., 2006). Within JSO samples, different subgroups may vary in terms of their predispositions, which is why they require interventions that are tailored to their particular needs (Becker & Hicks, 2003).

The heterogeneity of JSOs

Studies of JSOs to date examine a variety of offense-related variables. These include, but are not limited to, the severity and type of sexual coercion in which a JSO has engaged (e.g., non-contact offenses, fondling, oral, vaginal, or anal penetration), the degree of physical force exerted during the offense, age of the victim (e.g., child vs. adolescent), gender of the victim, relationship with the victim (acquaintance vs. stranger vs. relative), and further offense characteristics, such as whether multiple victims or multiple perpetrators are involved (Aebi et al., 2012; Bijleveld & Hendriks, 2003; Bijleveld, Weerman, Looije, & Hendriks, 2007; Fanniff & Kolko, 2012; Fehrenbach et al., 1986; Gunby & Woodhams, 2010; Hart-Kerkhoffs et al., 2009; Höing et al., 2010; Kjellgren et al., 2006; Leroux et al., 2016). Furthermore, the authors of several studies analyzed the personal traits and psychosocial adversity of JSOs, e.g., age and nationality, low socioeconomic status (SES), violence and substance-abuse problems within the family, broken-home and outplacement situations, school problems, behavioral problems, social isolation, prior sexualized behavior, prior and continuous sexual and nonsexual delinquency, and adverse childhood experiences in terms of, e.g., sexual or physical abuse (Aebi et al., 2012; Bijleveld et al., 2007; Butler & Seto, 2002; Cale, Smallbone, Rayment-McHugh, & Dowling, 2016; Fanniff & Kolko, 2012; Fehrenbach et al., 1986; Gunby & Woodhams, 2010; Höing et al., 2010; Kjellgren et al., 2006; Leroux et al., 2016; Seto & Lalumière, 2010).

A number of recent studies have attempted to unravel the diversity of JSO samples by assigning juveniles to specific subtypes incorporating several of the abovementioned offense and personal characteristics – see, e.g., Murphy et al. (2016) and Rasmussen (2005) for over-

views. One of the most common subtyping approaches involved comparing JSOs who had committed sexual offenses against children (JSO-Cs) with those who had offended against other adolescents or adults (JSO-As) (Leroux et al., 2016). On average, studies found that JSO-Cs differed from JSO-As in terms of (a) age (younger); (b) nationality (more often native [i.e., Swiss] individuals); (c) victim characteristics (more often male, related and/or multiple victims); (d) offense characteristics (more often individual rather than group offenders, more severe offenses but less physical aggression); (e) psychosocial adversity (more highly burdened, especially with experiences of bullying and/or social exclusion); and (f) behavioral problems (fewer conduct problems or other general delinquent/antisocial behaviors) (Aebi et al., 2012; Fanniff & Kolko, 2012; Gunby & Woodhams, 2010; Hart-Kerkhoffs et al., 2009; Hendriks & Bijleveld, 2004; Hunter, Figueredo, Malamuth, & Becker, 2003; Kjellgren et al., 2006; Leroux et al., 2016; Seto & Lalumière, 2010; Skubic Kemper & Kistner, 2010). Furthermore, JSO-subtypes were compared on the basis of their criminal histories and/or on offender status (individual vs. group offenders). It emerged that the selection of a related victim was less common among perpetrators who also committed nonsexual offenses than among JSOs who had committed no further nonsexual crimes (Chu & Thomas, 2010). JSOs offending on their own were found to victimize relatives and males more often than those acting as part of a group (Aebi et al., 2012).

To date, only a fraction of subtyping studies have included criminal persistence data. Fanniff and Kolko (2012), for instance, found JSO-As to be at higher risk of re-arrest for general crime than JSO-Cs. No differences were found in terms of risk of sexual criminal persistence. Whereas JSOs with a history of additional nonsexual delinquency were found to be at increased risk for future general criminal offending than those who had engaged exclusively in sexually abusive behavior, no differences were found in terms of sexual criminal persistence (Aebi et al., 2012; Butler & Seto, 2002; Chu & Thomas, 2010). Findings of Hart-Kerkhoffs et al. (2009) indicated that group offending was associated with future nonsexual crime. Apart from particular subtypes, both specific offense characteristics and types of psychosocial adversity (such as the selection of multiple victims or social isolation) have been associated with an elevated risk of sexual criminal persistence (Worling & Långström, 2003).

Empirical subtyping approaches

Although each proposed subtyping approach has identified specific differences among JSOs, they all overlap to a large degree. Aebi et al. (2012), for instance, found JSO-Cs more often perpetrating against related victims, and showing more severe offenses compared to JSO-As. Equally, individual offenders showed elevated frequencies of perpetrating against

relatives and more severe offenses than group offenders. Hence, it does not become clear whether victim selection and offense severity can be traced back to the victim characteristic (child victim) or the offender status (individual offender). Thus, assignments to theoretically derived, predefined (dichotomous) subtypes may fail to produce a comprehensive picture of the heterogeneity among JSOs. Only one study identified offense-related subtypes of JSOs by using empirical techniques (cluster analyses). Based on a comparatively small forensic psychiatry sample (N = 56), Långström, Grann, and Lindblad (2000) found evidence for five separate clusters of JSOs differing in terms of psychopathology and sexual recidivism. Given the questionable representativeness of the sample and the very low number of JSOs in some subgroups (e.g., n = 3), however, this typology remains tentative.

Nevertheless, empirically based subtyping approaches that consider actual individual offense profiles appear promising. As such, the person-centered Latent Class Analysis (LCA) technique can be used to assign individual JSOs to mutually exclusive subtypes characterized by the similarity of individual offense patterns. Although we are not aware of any study using LCA to deduce offense-related JSO-subtypes, LCA approaches have become common in juvenile offender research. LCA has been used to deduce distinct JSO-subtypes based on adverse childhood experiences (Barra, Bessler, et al., 2017a), to identify personality profiles of general juvenile delinquents (Decuyper et al., 2013), or to examine associations of offense and family characteristics with criminal persistence in general juvenile delinquents (Bosick, 2015; Chng, Chu, Zeng, Li, & Ting, 2016; Mulder, Vermunt, Brand, Bullens, & Marle, 2012).

Despite their importance for clinical and policy proceedings, findings on the ongoing risk of JSO-subtypes as regards criminal persistence tend to be vague (Aebi et al., 2012). Apart from the reliance on theoretically derived dichotomous subtyping approaches, most previous research in this context has been limited to fairly small and/or selective JSO samples, resulting in a call for the examination of offender samples of greater comprehensiveness (Fanniff & Kolko, 2012). Moreover, although the matter is discussed in research dealing with adult sex offenders (Seto, 2015; Tener, Wolak, & Finkelhor, 2015), we are not aware of any comprehensive JSO study revealing a specific subtype of juveniles who have committed Internet-based forms of sexual coercion (e.g., sexual harassment via cell phone). Despite this, recent research highlights the frequency and significance of this sort of sexual offense among today's adolescents (Ashurst & McAlinden, 2015; Mohler-Kuo et al., 2014).

Aims of the present study

The present study aimed to clarify the risk of sexual and nonsexual criminal persistence in empirically derived offense-related JSO-subtypes based on a large, court-based sample. Taking into account the overlap among several of the binary classification schemes mentioned above, the current analyses included a range of well established offense characteristics, i.e., whether a JSO had engaged in non-contact or contact offenses; in oral, vaginal, or anal penetration; had used physical force; and had chosen a child, male or related victim, or multiple victims (Aebi et al., 2012; Bijleveld & Hendriks, 2003; Bijleveld et al., 2007; Fanniff & Kolko, 2012; Fehrenbach et al., 1986; Gunby & Woodhams, 2010; Hart-Kerkhoffs et al., 2009; Höing et al., 2010; Kjellgren et al., 2006; Leroux et al., 2016). Moreover, Internet-based forms of sexual harassment were taken into account. The age, nationality, and offender status (single vs. group offender) of the JSO were included as covariates in subtype assignment. In addition to predicting sexual and nonsexual criminal persistence, we analyzed psychosocial adversity (Aebi et al., 2012; Bijleveld et al., 2007; Butler & Seto, 2002; Cale et al., 2016; Fanniff & Kolko, 2012; Fehrenbach et al., 1986; Gunby & Woodhams, 2010; Höing et al., 2010; Kjellgren et al., 2006; Leroux et al., 2016; Seto & Lalumière, 2010) in order to gain a comprehensive picture of putative JSO-subtypes.

Based on previous research (see above), we made the following assumptions: We expected LCA to distinguish at least two distinct JSO-subtypes, i.e., perpetration against children and perpetration against peers/adults. JSOs with child victims were assumed to be younger and more often of native (Swiss) nationality as well as less often group offenders. We expected elevated probabilities of perpetrators against children having male, related, and multiple victims as well as more severe offenses, at the same time as lower instances of physical force. We also expected these JSOs to be more burdened with psychosocial adversity, especially social isolation. Because a number of the anticipated features of adolescents of the child victim subtype had been associated with sexual recidivism (e.g., multiple victims, social isolation; Worling & Långström, 2003), we expected these juveniles to be at increased risk of sexual reoffending. By contrast, JSOs with peer/adult victims were expected to be more often of foreign nationality, more often group offenders, and more often to have behavioral problems and have committed prior acts of nonsexual-violent delinquency. Due to their expected antisocial characteristics, we further assumed that these juveniles were at increased risk of nonsexual reoffending.

Methods

Procedures

An analysis of legal and medical files was conducted between February and December 2015 including a consecutive sample of juveniles from 14 mainly German-speaking Swiss cantons (states). These juveniles had been sentenced for sexual offenses based on the Swiss penal law (e.g., sexual harassment, exhibitionism, sexual abuse of a child, sexual coercion, or rape) between January 2007 and September 2014. Data was collected by a forensic psychologist, a student studying for a PhD in forensic psychology, and a student studying for a master's degree in psychology. A coding dictionary adapted from the Forensic Psychiatric Documentation System (Nedopil et al., 1986) was used to code the juveniles' criminal and personal characteristics. The coding dictionary encompassed court-related administrative data, demographic information, offense descriptions, developmental and criminal history, family background, adverse childhood experiences, and criminal reoffending. Interrater reliability was assessed on the basis of the two forensic psychologists' independent ratings of 30 case files chosen at random but stratified for file content (inclusion of a psychiatric/psychological expert opinion) and area of residence (urban or rural; cut-off: 10,000 residents). Interrater agreement on nominal and metric variables was measured by Cohen's kappa (κ) and the intraclass correlation coefficient (*ICC*; two-way random model, single measure, absolute agreement), respectively, with values above .60 considered to be substantial (Fleiss, 1981; Landis & Koch, 1977). All involved justice institutions gave written consent to analyze the JSOs' case files provided that data privacy was ensured. The ethics committees of Zurich and northwest/central Switzerland (EKNZ; lead ethics committee: Zurich, EC-No. 2010-0483) approved the study plan.

Sample

Initially, a total of 687 JSOs were included in the study. Because their numbers were too small for reliable statistical analyses (n = 14, 2.0%), females were excluded. Three further male JSOs were excluded due to missing information on age (n = 1) or nationality (n = 2). Consequently, the determination of JSO-subtypes was based on n = 670 male JSOs between 8.5 and 18.5 years of age (M = 14.49 years, SD = 1.94 years) at the first sexual assault for which they had been convicted during the abovementioned time period.

Analyses taking account of psychosocial adversity were conducted on a subsample of 321 JSOs (M = 14.13 years, SD = 1.93 years, range = 8.5–18.5 years) whose files included information on their developmental histories in the form of one or more developmental reports (e.g., psychiatric/psychological expert opinions, assessment reports, and/or therapy

documents written by a psychiatric/mental health care professional or social work professional).

Measures

Offense Characteristics. Ten binary variables were used to describe offending behavior. Six variables were related to the coercive acts as such, whereas four referred to characteristics of the victim: *Verbal/online harassment* was coded as present when a JSO had molested a victim verbally and/or online, i.e., by explicit sexual speech, by sending explicit sexual messages in chat rooms or via cell phone, or by taking and/or sharing explicit sexual photos or videos of the victim without permission (κ = .71). *Direct harassment* was coded as present when the JSO had molested a victim directly in a personal encounter, for example by forcing a victim to look at his or someone else's genitals, by forcing a victim to undress or show his/her genitals to someone else, by forcing a victim to watch someone else masturbating or having sex, or by masturbating in front of a victim (κ = .90). *Touch offense* was coded as present when the JSO had touched a victim sexually on his/her body and/or genitals, or forced a victim to stroke his penis/masturbate him (κ = .71). *Oral offense* was coded as present when the JSO had performed any oral sexual acts on a victim, or had forced a victim to perform any oral sexual acts on him (κ = .87). *Penetration offense* was coded as present when the JSO had had vaginal and/or anal intercourse with a victim (κ = .87). *Physical force* was coded as present when the JSO had physically coerced a victim in any way in order to perpetrate the sexual assault (e.g., holding a victim down, hitting a victim; κ = .66). *Child victim* was coded as present when the JSO had perpetrated at least one offense against a victim at least three years younger than himself and no more than 12 years old. This age cut-off had been used in earlier studies, and the age difference is in line with Swiss penal code requirements for sexual acts against children (e.g., Aebi et al., 2012). Moreover, the concurrent use of both age cut-off and age difference had been recommended in this context (Skubic Kemper & Kistner, 2010). *Male victim* was coded as present when the JSO had perpetrated at least one offense against a male victim (κ = 1.00). *Family victim* was coded as present when the JSO had perpetrated at least one offense against a related victim, including cousins and foster siblings (κ = 1.00). *Multiple victims* was coded as present when the JSO had perpetrated one or more offenses against at least two victims (κ = 1.00).

Covariates. Three covariates were analyzed for their predictive effects on offense patterns. *Age* referred to a JSO's age at the time of the first sexual assault for which he was convicted in the abovementioned time period (*ICC* = .90). *Foreign nationality* was coded as present when the JSO was not a Swiss citizen (κ = 1.00). *Group offender* was coded as present

when the JSO had exclusively committed sexual assaults jointly with at least one additional perpetrator (κ = .86). JSOs who had perpetrated offenses on their own as well as in groups were not considered group offenders (e.g., Aebi et al., 2012).

Criminal Persistence. Data on criminal persistence assessed by us were obtained from official penal records (Swiss Federal Office of Justice and Swiss Federal Statistical Office) as well as from the progress reports included in the case files (e.g., by psychologists or social workers supervising the JSO during implementation of the judicial measures to which he was subject). Examining these progress reports in addition to officially recorded reoffending appeared expedient to account for delinquent behavior that had not been charged/convicted or had escaped the attention of juvenile justice institutions, and thus to approximate the dark figure of juvenile crime (e.g., Wolff & Baglivio, 2016). In order to rule out potential bias, data on criminal persistence were collected after completion of the assessment of all other variables of interest. Based on studies highlighting a high-risk period for juvenile reoffending close to the time of the initial offense (Caldwell, 2010; Carpentier & Proulx, 2011), we examined criminal persistence within the first 1.5 years (548 days) after the current conviction. A JSO engaging in any sexual behavior that would meet the criteria for a sexual offense according to the Swiss penal code (except for pornography) was considered to have displayed *sexual* criminal persistence. A JSO engaging in any delinquent behavior according to the Swiss penal code that did not include any sexual content was considered to have displayed *nonsexual* criminal persistence. Both categories showed substantial interrater agreement ($\kappa \geq .73$).

Psychosocial Adversity. Psychosocial adversity was described by five variables taking family-related disadvantages into account (low SES, domestic violence, family substance-abuse problems, broken-home situations, outplacement), and five variables taking individual peculiarities into consideration (school problems, behavioral problems, social isolation, prior sexualized behavior, prior nonsexual-violent delinquency) – see Supplement 4 for detailed descriptions of each item.

Adverse Childhood Experiences (ACEs). To account for the multiplicity of stressful events a JSO may have experienced before the onset of his sexual assaults, a sum score of 10 categories of adverse childhood experiences (ACEs) as defined by the Maltreatment and Abuse Chronology of Exposure (MACE) scale (Isele et al., 2014; Teicher & Parigger, 2015) and the Child Sexual Abuse Questionnaire (CSAQ; Mohler-Kuo et al., 2014) (Supplement 5) were also included. The latter includes non-contact sexual harassment (e.g., via the Internet) in the definition of self-experienced sexual victimization, since this is a common form of sexual abuse in this day and age (Landolt et al., 2016; Mohler-Kuo et al., 2014). A given

ACE category was deemed fulfilled if anamnestic information indicated that any such experience had occurred. The resulting sum score ranged from 0 to 10 (*ICC* = .86). The MACE scale and CSAQ questionnaire have shown substantially accurate reliability and validity estimates for self-reported data (Aebi, Landolt, et al., 2015; Isele et al., 2014; Teicher & Parigger, 2015). Interrater agreement in the present study also indicates their suitability for file analyses.

Statistical analyses

The 10 offense characteristics served as indicators for the generation of subtypes through LCA using a robust maximum likelihood estimator in Mplus 7.31 (Muthén & Muthén, 1998-2015). Age at the first sexual assault (z-transformed), foreign nationality, group-offender status, and the interaction of nationality and group-offender status (bearing in mind previous findings that group offending and ethnic minority are highly correlated; e.g., Höing et al., 2010) were included as covariates. Following recommendations by Asparouhov and Muthén (2014) as well as Bray, Lanza, and Tan (2015), model estimation was based on a three-step approach (*r3step-command*). By integrating covariates directly into the model estimation process, this approach reduces measurement error in the assignment of individual subjects to subtypes, compared to oft-used classify-analyze approaches (Bray et al., 2015). Subtype assignments were based on the most probable membership according to individual offense patterns. Entropy values above .80 indicated clear subtype assignments (Clark & Muthén, 2009). Four-hundred random starts were conducted to counteract possible bias resulting from local maxima.

Models with differing numbers of subtypes were compared using the following indicators to find the best-fitting solution. Data fit was considered better for models with lower values on the Akaike Information Criterion (AIC; Akaike, 1974), the Bayesian Information Criterion (BIC; Schwarz, 1978), and the sample-size-adjusted Bayesian Information Criterion (aBIC; Sclove, 1987). Simultaneously, the Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLM LRT; Lo et al., 2001; Vuong, 1989), the Lo-Mendell-Rubin Likelihood Ratio Test (LMR LRT; Lo, Mendell, & Rubin, 2001), and the Bootstrapped parametric Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000) were applied. The likelihood ratio tests compare a model with *k* subtypes to one with *k-1* subtypes. The fit of a *k*-subtype solution is considered to be significantly improved compared with the *k*-1 solution if the test statistic reaches a *p* value below .05. In addition to these indicators, entropy values of the models and interpretability of the derived subtypes were considered for model selection.

Further analyses were performed in IBM SPSS 23. ANOVAs and χ^2 statistics were applied for group comparisons of the distribution of variables among subtypes, accompanied by respective post-hoc tests (such as Games-Howell tests and Mann-Whitney-U tests). Significant deviations from the expected cell counts were indicated by adjusted residuals (*AR*s) above 2.0 (more than expected) or below -2.0 (less than expected). Cox regressions were performed to examine the relationships between subtypes and criminal persistence. The number of days between the current conviction and the first instance of sexual or nonsexual reoffending was entered as a dependent variable up to a maximum of 548 days. The proportional hazard assumption (the expectation that covariate effects on the individuals' hazards will remain constant over time) was confirmed with a significance level above .05.

Results

Descriptive analyses

Nearly one fourth of the total sample of JSOs (*n* = 159, 23.7%) had engaged in verbal/online harassment, 376 (56.1%) in direct harassment, 472 (70.4%) in touch offenses, 191 (28.5%) in oral offenses, and 156 (23.3%) in penetration offenses. Physical force had been used by 274 JSOs (40.9%). Over one third of the sample (*n* = 235, 35.1%) had perpetrated an offense against a child victim, 162 (24.2%) against a male victim, 80 (11.9%) against a family member, and 116 (17.3%) against multiple victims. Foreign nationality was coded in 239 JSOs (35.7%). The distribution of single (*n* = 362, 54.0%) and group offenders (*n* = 308, 46.0%) was nearly balanced. Forty-two (6.3%) of the JSOs had shown sexual and 205 (30.6%) nonsexual criminal persistence.

Supplement 4 lists the prevalence rates of the variables describing psychosocial adversity in the subsample of 321 male JSOs with anamnestic information. Around two thirds of these JSOs exhibited school and/or behavioral problems, half came from broken-home situations, and over one third had a history of prior sexualized behavior, domestic violence, and/or social isolation. The average ACE sum score was 2.92 (*SD* = 2.42, range 0-10; see Supplement 5).

Subtypes based on offense patterns

Table 10 displays the comparisons of models with two to nine subtypes. Although AIC and aBIC were lowest for the models with eight and six subtypes, respectively, the four-subtype model was found to have the smallest BIC. All three likelihood ratio tests (VLM LRT, LMR LRT and BLRT) indicated that the four-subtype solution fit the data significantly better than the three-subtype model. Conversely, two of the likelihood ratio tests (VLM LRT and LMR LRT) indicated that the five-subtype solution did not fit the data any better than

Table 10

Model Comparisons of Latent Class Analyses Based on 10 Offense Characteristics in N = 670 JSOs

Number of sub-types	Log Like-lihood	AIC	BIC	aBIC	*p* (VLM LRT)	*p* (LMR LRT)	*p* (BLRT)	Entropy
2	-3480.97	7003.93	7098.59	7031.91	.000	.000	.000	.78
3	-3402.21	6868.43	7012.66	6911.06	.001	.001	.000	.83
4	-3346.85	6779.71	6973.52	6836.99	.000	.000	.000	.87
5	-3313.92	6735.84	6979.23	6807.78	.052	.055	.000	.87
6	-3285.14	6700.27	6993.24	6786.86	.056	.057	.000	.83
7	-3267.58	6687.16	7029.71	6788.41	.104	.108	.000	.83
8	-3253.77	6681.53	7073.66	6797.43	.327	.332	.158	.82
9	-3243.44	6682.88	7124.59	6813.43	.152	.156	.375	.84

Note. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, aBIC = sample-size adjusted Bayesian Information Criterion, VLM LRT = Vuong-Lo-Mendell-Rubin Likelihood Ratio Test, LMR LRT = Lo-Mendell-Rubin Likelihood Ratio Test, BLRT = Bootstrapped parametric Likelihood Ratio Test.

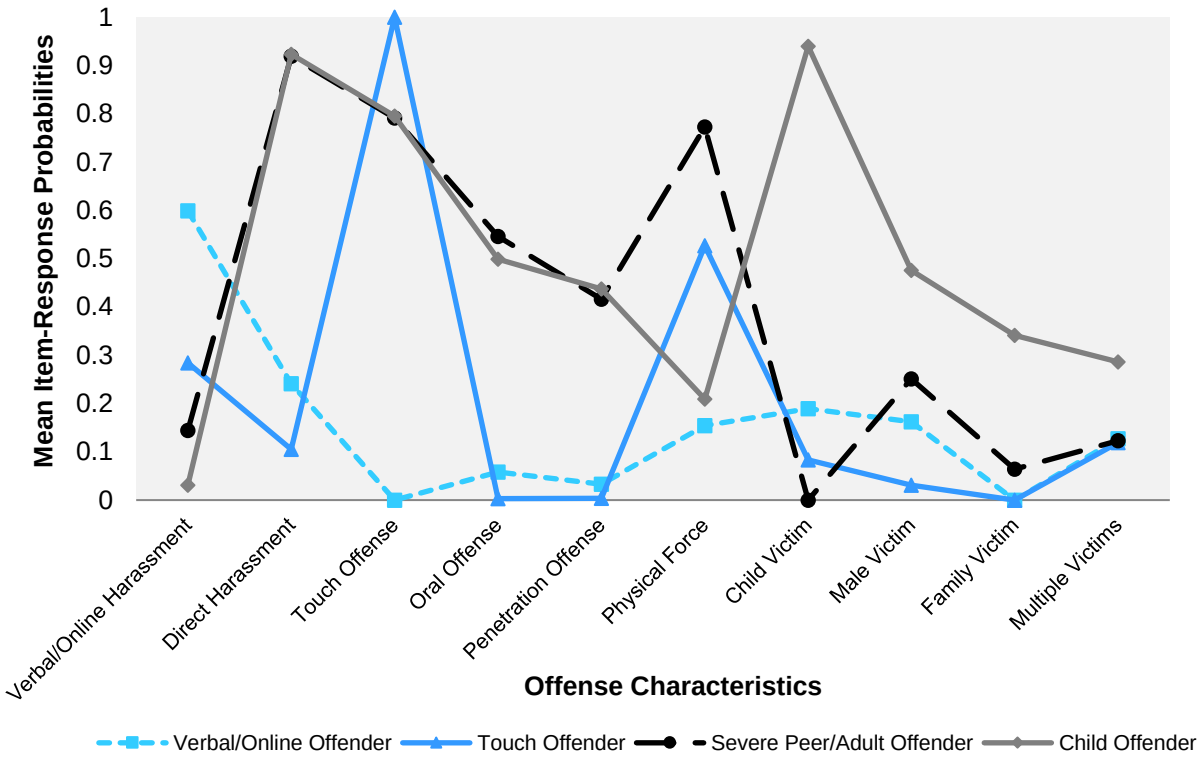

Figure 12. Four-subtype solution of the latent class analysis based on mean item-response probabilities.

the more parsimonious one with four subtypes. The four-subtype model yielded the highest entropy value among contrasted models, in addition to displaying subtypes that could be interpreted reasonably well. Because of this, further analyses were based on the assignments of the four-subtype model (Figure 12).

A *verbal/online-offender subtype* (*n* = 131, 19.6%) showed the highest probability among the subtypes for verbal/online harassment, whereas item-response probabilities for the other offense characteristics were low. *A touch-offender subtype* (*n* = 187, 27.9%) showed the highest probability for touch offenses, and relatively high probabilities of using physical force. A *severe peer/adult-offender subtype* (*n* = 150, 22.4%) and a *child-offender subtype* (*n* = 202, 30.1%) showed similar probabilities for most variables describing the offense itself. By contrast, the child-offender subtype displayed the greatest average probability of having had a child victim, a male victim, a related victim, and multiple victims, while the severe peer-/adult-offender subtype had the greatest average probability of using physical force.

Influences of covariates on subtype assignment

Tables 11 and 12 display the associations of covariates with subtype assignments. JSOs of the child-offender subtype appeared to be younger, to be more often of Swiss nationality, and to be more often single offenders compared to the JSOs from other subtypes. Significant interaction terms were found for predicting the child-offender subtype vs. the verbal/online subtype or the touch-offender subtype: The probability of being assigned to the child-offender subtype was lower for native (Swiss) JSOs where they were group offenders, and lower for solo offenders where they were of foreign nationality.

Associations of subtypes with sexual and nonsexual criminal persistence

Table 13 lists the differences in prevalence rates of sexual and nonsexual criminal persistence for the four subtypes. A total of 668 JSOs (99.7%) could be followed until the maximum follow-up period of 548 days. Two JSOs showed slightly shorter observation periods (504 and 545 days). Hazard ratios (*HR*s) for sexual and nonsexual criminal persistence were calculated. The verbal/online-offender subtype served as reference category. The proportional hazards assumption was affirmed for both Cox regression models ($p = .148$ and $p = .711$, respectively). The severe peer/adult-offender subtype was positively associated with both sexual and nonsexual criminal persistence. The child-offender subtype was positively associated with sexual criminal persistence by trend. Neither the verbal/online-offender subtype nor the touch-offender subtype was associated with sexual or nonsexual criminal persistence.

Table 11

Distributions of Covariates Among Subtypes in N = 670 JSOs

	Subtype													
	Verbal/online offender			Touch offender			Severe peer/adult offender			Child offender			Group comparison	
Covariate (*n*)	*n*	%	*AR*	*n*	%	*AR*	*n*	%	*AR*	*n*	%	*AR*	χ^2	*df*
Foreign nationality (239)	45	18.8	-0.4	80	33.5	2.4	67	28.0	2.6	47	19.7	-4.4	23.05***	3
Group offender status (308)	58	18.8	-0.4	117	38.0	5.4	95	30.8	4.8	38	12.3	-9.3	99.08***	3
	M	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	*F*	*df*
Age (670)	15.56	1.78	10.25 -18.33	14.58	1.76	10.17 -17.92	14.79	1.86	10.00 -18.00	13.49	1.80	8.50 -18.50	37.90***	3

Note. *AR* = adjusted residual. Significant deviations from the expected cell counts are indicated by *AR* values of ≥ 2.0 (more than expected) and ≤ -2.0 (less than expected).
***$p < .001$.

Table 12

Effects of Covariates on Subtype Affiliations Among Subtypes in N = 670 JSOs

Subtype	Covariate	Odds ratios related to reference subtype			
		Verbal/ online offender	Touch offender	Severe peer/adult offender	Child offender
Verbal/online offender	Age	-	2.03***	1.62*	4.76***
	Group offender	-	0.70	0.65	10.12***
	Foreign nationality	-	0.95	1.07	3.08**
	Group offender*Foreign nationality	-	0.60	0.40	0.18*
Touch offender	Age	0.49***	-	0.80	2.34***
	Group offender	1.43	-	0.94	9.74***
	Foreign nationality	1.05	-	1.12	3.24***
	Group offender*Foreign nationality	1.67	-	0.66	0.30*
Severe peer/adult offender	Age	0.62**	1.25	-	2.94***
	Group offender	1.53	1.07	-	15.52***
	Foreign nationality	0.94	0.89	-	2.89*
	Group offender*Foreign nationality	2.51	1.51	-	0.45
Child offender	Age	0.21***	0.43***	0.34***	-
	Group offender	0.10***	0.07***	0.06***	-
	Foreign nationality	0.33**	0.31***	0.35*	-
	Group offender*Foreign nationality	5.53**	3.32*	2.20	-

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 13

Prevalence Rates and Hazard Ratios from Cox-Regressions with Subtypes on Sexual and Nonsexual Recidivism in N = 670 JSOs

Indicators (*N*)	Sexual recidivism						Nonsexual recidivism					
					95% CI						95% CI	
	n	*%*	*AR*	*HR*	*LL*	*UL*	*n*	*%*	*AR*	*HR*	*LL*	*UL*
JSO-subtype												
Verbal/online offender (131)	4	3.1	-1.7				33	25.2	-1.5			
Touch offender (187)	6	3.2	-2.0	1.04	0.29	3.69	56	29.9	-0.2	1.18	0.77	1.82
Severe peer/adult offender (150)	15	10.0	2.1	3.36*	1.12	10.12	57	38.0	2.2	1.62*	1.06	2.49
Child offender (202)	17	8.4	1.5	2.80^{+}	0.94	8.31	59	29.2	-0.5	1.18	0.77	1.81

Note. AR = adjusted residual. Significant deviations from the expected cell counts are indicated by *AR* values of ≥ 2.0 (more than expected) and ≤ -2.0 (less than expected). The verbal/online-offender subtype served as reference category for Cox regressions. *HR* = hazard ratio, CI = confidence interval, *LL* = lower limit, *UL* = upper limit.

$^{+}p < .10$, $*p < .05$.

Subtype differences in psychosocial adversity

Of the 321 JSOs considered in the analysis of psychosocial adversity, n = 38 (11.8%) belonged to the verbal/online-offender subtype, n = 55 (17.1%) to the touch-offender subtype, n = 88 (27.4%) to the severe peer/adult-offender subtype, and n = 140 (43.6%) to the child-offender subtype. Child offenders (AR = 7.3) and severe peer/adult offenders (AR = 3.0) were overrepresented among these cases in comparison with touch offenders (AR = -6.0) and verbal/online-offenders (AR = -4.8), $\chi^2(3) = 88.41$, $p < .001$.

Table 14 displays the distributions of the psychosocial adversity variables among subtypes. No overall differences were found for low socioeconomic status and outplacement. JSOs of the verbal/online-offender subtype showed reduced rates of both behavioral problems and prior sexualized behavior. JSOs of the touch-offender subtype showed reduced prevalence rates for domestic violence, family substance problems and broken-home situations as well as reduced rates of school problems. JSOs of the child-offender subtype had higher rates of broken-home situations, higher frequencies of social isolation, and lower rates of prior nonsexual-violent delinquency. JSOs of the severe peer/adult-offender subtype were overrepresented among juveniles with a history of school problems, behavioral problems, and prior nonsexual-violent delinquency. The child-offender subtype showed the highest number of cumulative ACEs, followed by the severe peer/adult-offender, the verbal/online-offender and the touch-offender subtypes. Both parametric and non-parametric ANOVAs indicated group differences among subtypes with regard to cumulative ACEs. Post hoc tests revealed significant differences between the touch-offender and child-offender subtypes as well as between the touch-offender and the severe peer/adult-offender subtypes (Games-Howell tests: p = .004 and p = .041, respectively; Mann-Whitney U-Test: $p < .001$ and p = .009, respectively).

Additional analyses for JSOs with criminal persistence

In order to further examine the characteristics of those JSOs who were at increased risk of sexual and/or nonsexual criminal persistence, we conducted additional intra-group comparisons on the variables describing psychosocial adversity for the JSOs from the severe peer/adult-offender subtype and the child offender-subtype. Analyses only included JSOs whose case files contained anamnestic information (severe peer/adult-offender subtype: n = 88, 58.7%; child-offender subtype: n = 140, 69.3%). Anamnestic information was available for all JSOs who showed sexual criminal persistence. No differences were found between JSOs of the severe peer/adult-offender subtype with (n = 15) and without (n = 73) sexual criminal persistence. Equally, intra-group comparisons among JSOs of the child-offender

Table 14

Distributions of Variables Describing Psychosocial Adversity and ACE Sum Scores Among Subtypes in N = 321 JSOs

	Subtype (*N*)												Group comparison			
	Verbal/online offender			Touch offender			Severe peer/adult offender			Child offender						
Outcome (*n*)	*n*	%	*AR*	*n*	%	*AR*	*n*	%	*AR*	*n*	%	*AR*	χ^2	*df*		
Low SES (47)	7	14.9	0.6	6	12.8	-0.8	18	38.3	1.7	16	34.0	-1.3	3.87	3		
Domestic violence (118)	15	12.7	0.4	10	8.5	-3.1	34	28.8	0.4	59	50.0	1.8	10.16*	3		
Family substance-abuse problems (64)	10	15.6	1.0	4	6.3	-2.6	22	34.4	1.4	28	43.8	0.0	7.91*	3		
Broken home (174)	19	10.9	-0.6	20	11.5	-2.9	47	27.0	-0.2	88	50.6	2.7	11.57**	3		
Outplacement (68)	8	11.8	0.0	8	11.8	-1.3	19	27.9	0.1	33	48.5	0.9	1.94	3		
School problems (123)	25	11.8	0.0	23	10.8	-4.2	69	32.5	2.9	95	44.8	0.6	20.60***	3		
Behavioral problems (215)	20	9.3	-2.0	31	14.4	-1.9	71	33.0	3.2	93	43.3	-0.1	13.85**	3		
Social isolation (120)	11	9.2	-1.1	15	12.5	-1.7	28	23.3	-1.3	66	55.0	3.2	10.42*	3		
Prior sexualized behavior (134)	9	6.7	-2.4	18	13.4	-1.5	42	31.3	1.3	65	48.5	1.5	9.49*	3		
Prior nonsexual-violent delinquency (36)	6	16.7	1.0	8	22.2	0.9	16	44.4	2.4	6	16.7	-3.5	12.54**	3		
	M	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	χ^2	*df*	*F*	*df*
ACE sum score	2.66	2.55	0-8	2.02	2.14	0-8	3.07	2.48	0-10	3.24	2.35	0-9	13.21**	3	3.76*	3

Note. ACE = Adverse Childhood Experiences. *AR* = adjusted residual. Significant deviations from the expected cell counts are indicated by *AR* values of ≥ 2.0 (more than expected) and ≤ -2.0 (less than expected). SES = Socioeconomic status.
*$p < .05$, **$p < .01$, ***$p < .001$.

subtype revealed no differences between JSOs with (n = 17) and without (n = 123) sexual criminal persistence. Furthermore, no association was found between affiliation with the severe peer/adult-offender or child-offender subtypes and sexual reoffending against a child victim, $\chi^2(1) = 0.21$, $p = .647$.

Concerning JSOs from the severe peer/adult offender subtype who showed nonsexual criminal persistence, anamnestic information was available for 71.9% (n = 41). These JSOs more often had school problems (n = 36, 87.8%) than the 47 JSOs of the severe peer/adult-offender subtype without nonsexual criminal persistence (n = 33, 702%), $\chi^2(1) = 4.00$, $p = .045$, as well as higher ACE sum scores, $U = 725.00$, $z = -2.01$, $p = .044$.

Discussion

A number of previous studies have attempted to explain the heterogeneity of JSOs by positing the existence of different JSO-subtypes based on offense characteristics and victim selection (Aebi et al., 2012; Bijleveld & Hendriks, 2003; Bijleveld et al., 2007; Fanniff & Kolko, 2012; Fehrenbach et al., 1986; Gunby & Woodhams, 2010; Hart-Kerkhoffs et al., 2009; Höing et al., 2010; Kjellgren et al., 2006; Leroux et al., 2016). Most of the existing studies were based on a priori assumptions of what criteria would be characteristic of potential subtypes. Only one previous study reported an empirically derived offense-oriented preliminary typology of JSOs using cluster analysis (Långström et al., 2000). Because the study in question was limited to more severe offenders who had undergone mental health assessment, however, the relevant findings may not generalize to other JSOs. Evidence for a more comprehensive, empirically based JSO typology is still lacking.

The present study represents the first examination of empirically derived offense-related subtypes based on a large and representative sample of JSOs. We identified four significant and mutually exclusive JSO-subtypes. Whereas one subtype described JSOs who offended against children, JSOs with adolescent or adult victims could be assigned to three distinct categories (see below). The present subtypes reflect previous theoretical assumptions, and partly corroborate the JSO subgroups reported by Långström et al. (2000). Among other things, we found evidence for a specific subtype of JSO who sexually harassed his victims exclusively verbally and/or via the Internet. Although adolescent online sexual offending has gained in significance and the number of corresponding offenses has increased over the last decade (Ashurst & McAlinden, 2015; Boonmann, Grudzinskas, & Aebi, 2014; Mohler-Kuo et al., 2014), no study to date has deduced the existence of a specific JSO verbal/online- offender subtype based on empirical data. Furthermore, our results indicate that not all JSOs represent a constant danger, nor are they all heavily burdened with prior experience of

psychosocial adversity. In point of fact, only two subtypes of JSOs at risk of sexual and/or nonsexual criminal recidivism were identified. These groups were also found to possess high rates of psychosocial disadvantage and family stressors. Below, subtypes and their relations to criminal persistence and psychosocial adversity are discussed in greater detail, and judicial and clinical indications are highlighted.

Child-offender subtype

In line with previous research (e.g., Aebi et al., 2012; Hart-Kerkhoffs et al., 2009; Kjellgren et al., 2006), JSOs of the child-offender subtype appeared to be younger, more often of native (Swiss) nationality, and more often single offenders than was the case with the other subtypes. In addition to offenses involving direct harassment, touching, and penetration, they displayed higher probabilities of offending against male, related, and multiple victims. Furthermore, they employed relatively low levels of physical aggression in the perpetration of their offenses. The present study found that JSOs offending against a child victim tended to be at higher risk of sexual (but not nonsexual) recidivism than youths committing non-contact or online offenses. The child-offender subtype had a comparable portion of JSOs who engaged in sexual recidivism but a somewhat lower portion of JSOs who engaged in nonsexual recidivism than JSOs of the peer/adult-offender subtype. In studies to date, recidivism rates for JSOs of the child-offender subtype have been found to vary considerably, and may depend to a large extent on the methodological criteria and sampling strategy used (Fanniff & Kolko, 2012; Keelan & Fremouw, 2013).

Furthermore, our findings are consistent with studies separating JSOs into "specialists" versus "generalists", which assign JSOs with child victims to the specialist category (e.g., Leroux et al., 2016; Seto & Lalumière, 2010). Yet, more specifically, our additional analyses suggested that JSOs with child victims may not necessarily retain their current victim patterns. Prior studies have stressed that a JSO's victim preferences may change over the course of adolescent sexual development (e.g., Worling & Curwen, 2000). The deterministic classification of these youths as "pedophilic juveniles" (Veneziano & Veneziano, 2002, p. 248) would therefore appear to be premature. The results presented here further support previous studies that consider JSOs with child victims to be highly burdened with intra- and extra-familial adversities (e.g., Gunby & Woodhams, 2010; Kjellgren et al., 2006), as indicated by elevated frequencies of broken-home situations, social isolation and a variety of (cumulative) adverse childhood experiences. These adversities may contribute to the increased risk of sexual criminal persistence, since they may be associated with an unfulfilled need for intima-

cy that JSOs attempt to satisfy through sexually coercive behavior (e.g., Marshall, 1993; Thornton & D'Orazio, 2016).

Peer/adult-offender subtype

Of the three subtypes comprising JSOs with adolescent or adult victims, the severe peer/adult-offender subtype was the most similar to the child-offender subtype in terms of offense descriptions, with the difference that JSOs of the severe peer/adult-offender subtype were relatively likely to engage in physical violence when perpetrating their offenses. We found JSOs of this subtype to be at increased risk of sexual and nonsexual recidivism, with those youth who reoffended appearing to be particularly prone to school problems and elevated rates of adverse childhood experiences. Overall, JSOs of the severe peer/adult-offender subtype appeared to have the most behavioral problems of all the subtypes, most frequently struggled in school, and most often displayed prior nonsexual-violent delinquency. In addition, they were generally characterized by higher burdens of adverse childhood experiences. Our results underscore findings from previous research describing JSOs with peer/adult victims as burdened and fairly anti-social generalists (e.g., Leroux et al., 2016; Murphy et al., 2016). Consequently, their initial sexual offense and elevated risk of sexual and nonsexual criminal persistence may reflect a generally violent and delinquent orientation, rather than a specific sexual deviance.

Verbal/online-offender and touch-offender subtypes

JSOs with adolescent and/or adult victims were further categorized into a verbal/online-offender subtype and a touch-offender subtype. Adolescents from both subtypes had perpetrated offenses assignable to single, clearly definable categories. Although neither of these subtypes was associated with either sexual or nonsexual criminal persistence, nor were they burdened with significant psychosocial adversity, the grievousness of their offenses must not be underrated.

Online variants of sexually abusive behavior have become increasingly prevalent among adolescents, with harmful consequences for victims (Ashurst & McAlinden, 2015; Wolak & Finkelhor, 2011). Mohler-Kuo et al. (2014) found sexual harassment through Internet devices to be the most common type of sexual victimization in a Swiss community sample. Despite this, research into online offending among JSOs is limited, and focuses primarily on (illegal) pornography use (although associations between the use of pornography and further online sexual harassment have been posited, e.g., Boonmann, Grudzinskas, & Aebi, 2014). Aebi, Plattner, Ernest, Kaszynski, and Bessler (2014) found that JSOs convicted of possession of child pornography were less likely to engage in sexual or nonsexual criminal

persistence than JSOs with contact offenses. Similarly, Seto (2015) concluded that adult online offenders had lower rates of future contact sexual offenses than did contact offenders. These findings may be attributable to enhanced self-control and reduced impulsivity in online offenders which prevent them from acting out potential sexual deviance through contact offenses (Babchishin, Hanson, & Hermann, 2011). It cannot be ruled out, however, that ongoing online sexual harassment is present but difficult to detect, owing to the anonymity of the Internet (Aebi, Plattner, et al., 2014). Although research into adult samples has pointed to specific online sexual-offender subtypes (Seto, 2015; Tener et al., 2015), the relevant findings need to be replicated in adolescent samples. The present paper is the first empirical study to highlight the existence of an exclusive JSO subtype whose offenses are mainly Internet-based.

The possibility that their sexually abusive behaviors could have been motivated largely by situational rather than personal factors may go some way towards explaining why JSOs of the touch-offender subtype may not display an increased risk for criminal persistence. JSOs of the touch-offender subtype, for instance, had the highest rate of group offending among subtypes. It has been shown that group offenses often involve physical violence, are frequently unplanned, and tend to be driven by dynamics of social comparison (e.g., showing off masculinity, giving in to group pressure) rather than being sexually motivated (Höing et al., 2010). In addition to an increased likelihood of group offending, the touch-offender subtype described here had the highest prevalence of youths of foreign nationality. This corroborated previous findings pointing to increased percentages of ethnic-minority youths among JSOs perpetrating group offenses (Bijleveld et al., 2007).

When discussing the role of nationality and group-offender status, however, two aspects are worth noting. The first is that JSOs with peer/adult victims were – in general – more likely to be of foreign nationality and to act in groups than JSOs with child victims, but that within the overall subsample of JSOs with peer/adult victims, nationality and group-offender status did not have any specific predictive relationship with the three particular subtypes. The second is that only JSOs of the severe peer/adult-offender subtype were at increased risk of sexual and nonsexual criminal persistence. Hence, it appears inappropriate to infer that all JSOs with peer/adult victims are continuously dangerous ethnic-minority group offenders (as could be deduced based on comparisons between JSOs with child victims and those with peer/adult victims in general). Instead, a more detailed perspective on these JSOs is warranted.

Strengths and limitations

Our findings must be interpreted in the light of several strengths and limitations. The present data were drawn from a large consecutive sample of JSOs. A multitude of personal and offense-related characteristics investigated in prior JSO subtyping approaches were jointly acknowledged. Moreover, the inclusion of Internet-based forms of sexually coercive behavior accounted for the growing rate of online sexual harassment (e.g., Mohler-Kuo et al., 2014). The use of LCA served as a statistically sound means for deriving mutually exclusive JSO-subtypes empirically based on similar offense patterns, thereby meeting recent calls for dimensional rather than dichotomous categorizations (Aebi et al., 2012). The inclusion of reoffending that had not been officially recorded along with registered instances of reoffending counteracted the problem of the dark field, and provided a more realistic approximation of actual prevalence rates for criminal persistence (Maier et al., 2013; Wolff & Baglivio, 2016).

By contrast, analyses of psychosocial adversity relied exclusively on a subsample of JSOs whose files contained some sort of professional anamnestic record. Among this subsample, JSOs of the more disturbed child-offender and severe peer/adult-offender subtypes were overrepresented. This indicates that the subsample with anamnestic data contained a disproportionate number of high-risk JSOs, limiting the generalizability of the respective findings. Furthermore, we cannot rule out the possibility that some new offenses may have remained unreported. Although some researchers suggested that juvenile recidivism should be examined soon after the initial offense (e.g., Carpentier & Proulx, 2011), a somewhat longer follow-up period would likely have resulted in slightly higher reoffending rates (Caldwell, 2016).

Moreover, the additional analyses for describing criminal persistence in greater detail relied on a very small subsample of adolescents, and thus need to be replicated with a larger sample of JSOs. Finally, the inclusion of juveniles who had committed general, nonsexual offenses would have been helpful when examining the specificities of certain JSO-subtypes as distinct from the characteristics of peers with no history of sexually abusive behavior. Equally, future studies may benefit from the inclusion of female JSOs to allow the examination of their specifics versus those of male JSOs (e.g., Oliver & Holmes, 2015).

Conclusions

The present findings shed light on the heterogeneity of juveniles who have shown sexually offending behavior (JSOs) enabling the formulation of recommendations for working with JSOs in judicial, clinical, research, and policy settings. The present subtypes differed

primarily in terms of predispositions and offense characteristics, emphasizing the need for a comprehensive assessment of the developmental, personal, and familial characteristics of JSOs as well as their cultural embedding and the situational aspects at the time of the offense (see, e.g., the confluence model; Malamuth & Malamuth, 1999). Most notably, we found that not all JSOs pose a continuous threat in terms of risk of criminal persistence. In fact, given their different predispositions, JSOs require treatment approaches tailored specifically to their needs (Becker & Hicks, 2003). Whereas both JSOs with child victims and those perpetrating severe offenses against peers/adults may benefit from interventions addressing the issue of intra- and extra-familial adversity, JSOs with child victims may particularly benefit from practicing social skills in order to overcome social isolation. By contrast, JSOs perpetrating severe offenses against peers/adults may require a more comprehensive approach covering antisocial conduct in general, such as interventions that include emotion-regulation training and parental participation (Fanniff & Kolko, 2012; Gunby & Woodhams, 2010). JSOs whose offenses are somewhat less severe (represented in the present study by the touch-offender and the verbal/online-offender subtypes) may benefit from appropriate educational rather than intensive therapeutic approaches. Potentially harmful group dynamics, for instance, should be addressed in both primary and secondary prevention programs that teach skills for escaping group pressure and avoiding social comparisons (Bijleveld & Hendriks, 2003). Moreover, there is a need for community-based prevention programs teaching juveniles about the possible consequences for both perpetrators and victims of online sexual harassment, in order to reduce this sort of sexually abusive behavior in the first place (Mohler-Kuo et al., 2014). With a view to assigning JSOs to the most appropriate measures, judicial institutions may be informed that a comprehensive assessment of a JSO's anamnestic, personal and offense-related characteristics is indicated as soon as criminal proceedings have set it.

The present study stresses that future research will benefit from subtyping approaches that go beyond the assignments of JSOs to theoretically defined dichotomous categories. The inclusion of multiple offense-related and personal characteristics allows a more complex investigation of JSOs in terms of their predispositions to and risks of criminal persistence. Nevertheless, additional characteristics such as symptoms of sexual preference disorder, psychiatric disorder, or abnormal personality traits (e.g., Andrade et al., 2006) should be taken into consideration in future subtyping studies. Lastly, our study indicates that the premature classification of JSOs as pedophilic offenders and/or continuously dangerous ethnic-minority group offenders does not take account of the actual heterogeneity of JSOs. We therefore rec-

ommend the avoidance of such labels in research and policy settings in order to counteract prejudice and stigmatization (Chaffin, 2008; A. J. Harris & Socia, 2016).

Supplements

Supplement 4

Descriptions and Prevalence Rates of Variables Describing Psychosocial Adversity in N = 321 JSOs

Item	Content (exemplary)	κ	Prevalence	
			n	%
Low socioeconomic status	JSO's legal guardians were both unemployed or unskilled workers (according to the International Standard Classification of Occupations [ISCO-08] guidelines[a]), or one was unemployed or an unskilled worker and the profession of the other was unknown.	.79	47	14.6
Domestic violence	At least one family member had stood out for physical violence in and beyond the family context.	.64	118	36.8
Family substance abuse problems	At least one family member had shown problematic alcohol or illegal drug use.	.75	64	19.9
Broken home situations	JSO had not been living with both biological parents at the time of the first convicted sexual assault.	1.00	174	54.2
Outplacement	JSO had been living in a youth institution or in foster care at the time of the first convicted sexual assault.	.90	68	21.2
School problems	JSO had a lagged school enrollment, had repeated a class, had been downgraded, and/or had been expelled from school.	.71	213	66.4
Behavioral problems	JSO had stood out for aggressive, rule-breaking, and/or oppositional behavior in the school, family, and/or leisure context.	.68	215	67.0
Social isolation	JSO had been subject to obvious social exclusion in the school, family, and/or leisure context.	.84	120	37.4
Prior sexualized behavior	JSO had shown problematic sexualized behavior before his first convicted sexual assault, including peculiar sexual thoughts and/or speech, public sexual touching, and/or early (before age 12) or excessive (several times a day) masturbation or porn consumption.	.80	134	41.7
Prior nonsexual-violent delinquency	JSO had been charged for bodily assault, affray, or robbery before the currently convicted sexual assaults.	.89	36	11.2

Note. [a]International Labour Organization. International standard classification for occupations 2008 (ISCO-08): Structure, group definitions and correspondence table. Geneva, Switzerland: International Labour Office; 2012.

Supplement 5

Descriptions and Prevalence Rates of Adverse Childhood Experiences in N = 321 JSOs

ACE	Scale	Content (exemplary)	Prevalence	
			n	%
Verbal abuse	MACE	JSO was shouted at, verbally humiliated, or threatened by a caregiver several times a year.	85	26.5
Nonverbal emotional abuse	MACE	JSO was confined or forced to assume adult responsibilities by a caregiver several times a year.	112	34.9
Physical abuse	MACE	JSO was physically punished by a caregiver several times a year.	100	31.2
Emotional abuse by peers	MACE	JSO was actively ostracized or verbally humiliated by peers several times a year.	129	40.2
Physical bullying	MACE	JSO was punched, kicked, or forced to do something against his will by peers several times a year.	58	18.1
Emotional neglect	MACE	JSO experienced a lack of family cohesion or the (un)intentional absence of a caregiver several times a year.	194	60.4
Physical neglect	MACE	JSO experienced non-fulfillment of basic physical needs or insufficient supervision several times a year.	123	38.3
Witnessing interparental violence	MACE	JSO witnessed physical violence from male caregiver towards female caregiver and/or vice versa several times a year.	57	17.8
Witnessing violence against siblings	MACE	JSO witnessed threats or physical/sexual assaults against a sibling by a caregiver several times a year.	27	8.4
Sexual victimization	MACE, CSAQ	JSO was forced into sexual acts by a caregiver or peer, or was harassed without contact, including by electronic means, several times a year.	51	15.9

Note. ACE = adverse childhood experience, CSAQ = Child Sexual Abuse Questionnaire (Mohler-Kuo et al., 2014), JSO = juveniles who have shown sexually offensive behaviors, MACE = Maltreatment and Abuse Chronology of Exposure scale (Isele et al., 2014; Teicher and Parigger, 2015). Adapted from "'Patterns of Adverse Childhood Experiences in Juveniles Who Sexually Offended," by Steffen Barra, Cornelia Bessler, Markus A. Landolt, and Marcel Aebi, 2017, *Sexual Abuse: A Journal of Research and Treatment*.

3.4 Study 4: Testing the validity of criminal risk assessment tools in sexually abusive youth

Reference: Barra, S., Bessler, C., Landolt, M. A., & Aebi, M. (2017b). *Testing the validity of criminal risk assessment tools in sexually abusive youth.* Manuscript submitted for publication.

Abstract

Although accurate risk appraisals are mandatory to provide effective treatment to juveniles who have sexually offended (JSOs), the current knowledge on the validity of risk assessment instruments for JSOs is inconclusive. We compared the predictive validities of the J-SOAP II, the ERASOR, and the VRAG-R concerning sexual, nonsexual-violent, and general criminal recidivism (based on both official and non-registered re-offenses) in a consecutive sample of 597 JSOs (M_{age} = 14.47 years, SD_{age} = 1.57 years) while accounting for different recidivism periods, offense severities, and cumulative burden of adverse childhood experiences (ACE). ROC and Cox regression analyses indicated that the tools allowed valid predictions of recidivism according to their intended purposes: The ERASOR was best suited to predict sexual recidivism within 0.5 and 3 years, the J-SOAP II was valid for predictions of sexual and nonsexual-violent recidivism within these recidivism periods, and the VRAG-R showed potential strengths in predicting nonsexual-violent recidivism, especially when committed above age 18. Elevated offense severity and burden of ACEs impeded predictive accuracies of the J-SOAP II and the VRAG-R, particularly in case of sexual recidivism. Our findings emphasize that risk assessment for JSOs must not rely solely on scores derived from risk assessment instruments (actuarial approach), but a comprehensive consideration of a JSO's criminal and developmental history is additionally necessary (structured professional judgment) to approach accurate risk appraisals.

Keywords: juvenile sexual offenders, J-SOAP II, ERASOR, VRAG-R, criminal recidivism

Public Significance Statement

The present study supports the use of the J-SOAP II, the ERASOR, and the VRAG-R to estimate the risk of criminal reoffending in sexually abusive adolescents. However, because risk prediction was impeded with greater offense severity and burden of childhood adversity, a comprehensive consideration of the adolescents' criminal and developmental histories is

recommended over the exclusive reliance on risk assessment instruments in order to make conclusions about individual re-offense risks.

Introduction

According to official statistics, almost every fifth sexual offense (apart from prostitution) registered in 2015 in the U.S. and Switzerland was committed by a minor (below age 18) (Federal Bureau of Investigation, 2016; Swiss Federal Statistical Office, 2016). Among juveniles who have been convicted or charged of sexual offenses (JSOs), recidivism rates range from 3-10% for sexual up to 43-45% for nonsexual re-offenses (Aebi et al., 2011; Caldwell, 2016). Identifying those JSOs who are at highest risk of engaging in persistent crime is a main challenge for judicial and clinical professionals in order to ensure that JSOs receive appropriate interventions that prevent them from reoffending but avoid stigmatization (Miccio-Fonseca & Rasmussen, 2011; Parks & Bard, 2006; Prentky et al., 2010; Rasmussen, 2013). Whereas a number of instruments have been developed to estimate recidivism risk in adult offenders, only few risk assessment tools exist for application with JSOs, and research about their reliability and predictive validity is inconclusive (Hempel et al., 2013; Murphy et al., 2016).

Different approaches to assess risk of criminal recidivism

Three approaches are commonly discussed for the appraisal of risk of criminal recidivism in adolescent and adult offender samples: (a) unstructured clinical judgment (UCJ); (b) actuarial approaches; and (c) structured professional judgment (SPJ). Brown and Singh (2014) summarize these approaches and their specific advantages and disadvantages as follows. First, they stress that, since UCJ is exclusively based on the assessor's clinical impression of the offender's individual recidivism risk, it affords a way of risk assessment that is both individualized and convenient (in terms of both time and money). However, due to its subjectivity and unstructured procedure, UCJ is highly prone to biased appraisal.

In contrast, actuarial approaches as structured methods of risk estimation are usually characterized by a list of empirically-established risk and/or protective factors which contribute to overall sum scores (or risk categories) with specific weights based on their contribution to re-offense risk found in comparable calibration samples (Brown & Singh, 2014). The overall sum scores (or risk categories) describe the recidivism risk of an individual in relation to those found in the sample used for the instrument's development. Advantages of actuarial risk instrument include their empirical foundation, objectivity, rapidity, and convenient applicability (mostly based on risk factors readily accessible in judicial and/or clinical case

files). On the other hand, actuarial approaches are disadvantageous as to their inability to address an offender's individual risk and/or protective factors and their limited transferability to samples that deviate from comparable calibration samples (Brown & Singh, 2014).

Finally, Brown and Singh (2014) stress SPJ as an promising answer to the limitations of actuarial approaches. Also based on a range of empirically-established risk and protective factors, the overall risk estimation of SPJ instruments is merged with the clinical impression that an assessor has gathered based on the comprehensive consideration of an individual's developmental, personal, and criminal characteristics. Thus, an advantage of SPJ is in the combination of empirical knowledge and individual characteristics. Yet, individualization again promotes the occurrence of subjective bias and leads to somewhat longer assessment duration compared with actuarial approaches (Brown & Singh, 2014).

In their meta-analysis which included more than 45,000 adults and adolescents who had committed sexual offenses, Hanson and Morton-Bourgon (2009) found actuarial assessment instruments superior to UCJ concerning the prediction of sexual, violent, and general reoffending, whereas the predictive accuracies of SPJ procedures ranged between those of actuarial and UCJ approaches. However, the authors underscore that the number of studies that included SPJ was low and that the related findings were inconclusive, and thus suggest further examining the predictive validities of SPJ-based instruments (Hanson & Morton-Bourgon, 2009). Bearing in mind that SPJ is the most commonly used risk assessment approach for sexually abusive adolescents (Hempel et al., 2013), the investigation of risk assessment instruments and the comparison with different risk assessment approaches, such as actuarial approaches, is of major importance in samples of JSOs.

J-SOAP II and ERASOR

Two well-established JSO risk assessment tools that have received major scientific interest (Hempel et al., 2013; Miccio-Fonseca, 2016; Rettenberger et al., 2014; E. P. Ryan, 2016) are the Juvenile Sex Offender Assessment Protocol II (J-SOAP II; Prentky & Righthand, 2003) and the Estimate of Risk of Adolescent Sexual Offense Recidivism (ERASOR; Worling & Curwen, 2001). The J-SOAP II (or, more exactly, its precursor J-SOAP; Prentky, Harris, Frizzell, & Righthand, 2000) has been considered the "pioneer of risk assessment tools" for JSOs (Rasmussen, 2013, p. 124). First introduced in 1994 (Prentky et al., 2000), the instrument underwent a series of studies on its factor structure, reliability, and predictive validity, and was published in its current 28-item format in 2003 (Prentky & Righthand, 2003). The J-SOAP II is applicable to JSOs between 12 and 18 years of age to predict sexual and nonsexual reoffending (Prentky & Righthand, 2003). As item scores are

cumulated to create an overall risk score as well as specific subscale scores (see below), the J-SOAP II was developed in order to provide an actuarial risk assessment instrument for JSOs. However, it is currently not meant to be used as such because no cut-off values or risk categories have yet been established. Since the J-SOAP II is based on risk factors for sexual and other criminal offending established in the literature, it may yet serve as a guidance tool for decision-making as part of an extensive SPJ risk assessment process (Prentky & Righthand, 2003). Due to potential changes in dynamic risk factors, re-assessment is recommended every six months or even more often when relevant changes occur in a JSO's living conditions (Prentky et al., 2010). Regarding the predictive validity of the J-SOAP II, recent research points to mixed results (Fanniff & Letourneau, 2012; Wijetunga et al., 2016). Although its developers highlight the predictive value of the J-SOAP II and its precursors for sexual reoffending (Prentky et al., 2010; Righthand et al., 2005), other researchers have reported more critical results related to the prediction of sexual and nonsexual recidivism (e.g., Caldwell et al., 2008; Martinez et al., 2015; Viljoen et al., 2008; Wijetunga et al., 2016).

The ERASOR was developed based on the Sexual Violence Risk-20 scale (Boer, 1997) and empirically-proven risk factors for sexual offending (Worling & Curwen, 2001). According to the authors (Worling & Curwen, 2001), the ERASOR is applicable for risk assessment concerning sexual recidivism in JSOs between 12 and 18 years of age. The authors highlight that the ERASOR is not suitable as an actuarial instrument but offers guidance for raters to make clinical decisions based on relevant risk factors. Thus, the ERASOR is a SPJ-based instrument. Re-assessment is recommended periodically (e.g., every six months; Viljoen et al., 2009) and is necessary when relevant changes in risk factors occur. The authors themselves found the ERASOR to show good psychometric properties, the ERASOR clinical rating to be predictive of sexual recidivism within a period of 2.5 years, and a cumulative risk score (as the sum of all 25 items) to be predictive of sexual and nonsexual-violent recidivism over a mean follow-up period of 3.66 years (Worling, 2004; Worling et al., 2012; Worling & Langton, 2015). However, other research groups found the ERASOR not to be predictive of sexual reoffending but suitable to predict general re-offenses (e.g., Quenzer & Dahle, 2010; Viljoen et al., 2009).

As to a direct comparison of the J-SOAP II and ERASOR, a meta-analysis of 33 studies including more than 6000 JSOs did not find any differences in their moderate predictive validities for sexual reoffending (Viljoen et al., 2012). In conclusion, both the J-SOAP II and the ERASOR may be used collaterally in risk assessment to approach a clinical decision, but neither of the tools has yet shown consistent empirically-proven reliability and validity

(Miccio-Fonseca, 2016; Schlank et al., 2016). Thus, more research on the usability of these instruments for risk assessment in JSOs is needed (Rasmussen, 2013).

VRAG-R

Although caution is advised in the comparison of risk factors for JSOs and adults who have sexually offended (Miccio-Fonseca & Rasmussen, 2011; E. P. Ryan, 2016; Schlank et al., 2016), recent research has indicated that risk assessment tools originally designed for adults may have some predictive value for JSOs too (Ralston & Epperson, 2013). Lately, the Violence Risk Appraisal Guide-Revised (VRAG-R; G. T. Harris et al., 2015; Rice et al., 2013) has been introduced as a simplified, time-efficient combination of the Violence Risk Appraisal Guide (VRAG; e.g., G. T. Harris, Rice, & Quinsey, 1993) and the Sex Offender Risk Appraisal Guide (SORAG; e.g., Quinsey, Harris, Rice, & Cormier, 1998) which represent actuarial tools to assess the risk of sexual and other violent reoffending. The VRAG and SORAG had been found to predict violent and sexual re-offenses in adult samples, especially for older offenders (above age 25) and those with sexual offenses of greater severity (Rettenberger & Eher, 2007; Singh, Grann, & Fazel, 2011). Still, studies on the accuracy of the VRAG-R are scarce. In a sample of adult forensic inpatients from Canada, the VRAG-R was not found to predict inpatient aggression (Hogan & Olver, 2016). However, the authors themselves pointed to satisfactory predictive validity of the VRAG-R in adult and adolescent samples (G. T. Harris et al., 2015; Rice et al., 2013). Yet, concerning juveniles, they suggest using the VRAG-R only for the assessment of violent/sexual recidivism in adulthood (above age 18), although research to support this recommendation is still lacking.

Considering offense severity and adverse childhood experiences in risk prediction

Some researchers have criticized applying risk assessment instruments to samples that differed from those the tools were initially constructed for, e.g., in regard to offense severity. Hecker (2014), for instance, underscored that the J-SOAP II had been developed in a sample of JSOs who had shown coercive sexual activity, and thus questioned its applicability in JSOs with somewhat less severe (e.g., non-contact) offenses. Although some studies have compared the predictive validities of risk assessment tools in JSO samples with higher proportions of severe offenses (e.g., JSOs in correctional facilities) to the predictive validities of these instruments in JSO samples with higher proportions of less severe offenses (e.g., JSOs in residential treatment programs), findings are inconclusive (e.g., Martinez et al., 2015). Moreover, we are not aware of any study that has directly examined the potential effects of offense severity on risk prediction in JSOs. Bearing in mind that greater offense severity has been found to play a non-negligible role in the prediction of criminal recidivism in JSOs (e.g.,

Aebi et al., 2011), more research is needed to examine the accuracy of risk assessment tools in consecutive samples with varying degrees of offense severity.

Furthermore, recent empirical findings have highlighted that recidivism in general juvenile delinquents and in JSOs may be associated with the adolescents' histories of adverse childhood experiences (ACEs) (e.g., Baglivio et al., 2015; Carpentier & Proulx, 2011; Mallie et al., 2011; van der Put & De Ruiter, 2016). Fox et al. (2015) even point to the potential use of a cumulative ACE score (sum of multiple experienced ACE categories) in the early detection of future severe, violent, and permanent adolescent offenders. Other researchers have also recommended considering the influence of ACEs (e.g., in terms of the adolescents' "parents' issues, denial, support, or lack of support"; Schlank et al., 2016, p. 255) in juvenile risk assessment. As most JSOs have been found to be burdened with multiple ACEs (e.g., Barra, Bessler, et al., 2017a) and to show more types of ACEs than general adolescent offenders (Seto & Lalumière, 2010), the consideration of ACEs in risk assessment appears to be of particular importance for these juveniles. Although risk assessment tools for JSOs usually include some types of ACEs (e.g., J-SOAP II: item 8 - *sexual victimization*, item 16 - *physical victimization/family violence*, item 23 - *quality of peer relationships*, item 28 - *support system*; ERASOR: item 13 - *social isolation*, item 20 - *family dysfunction*, item 21 - *parental refusal*; VRAG-R: item 1 - *living with both biological parents*), none of them provides a comprehensive consideration of a JSO's ACE history. Thus, it remains unclear whether cumulated intra- and extra-familial ACEs would influence their predictive validities for criminal recidivism.

Limitations of previous research

So far, empirical evidence on the predictive validity of risk assessment tools for JSOs is mixed (e.g., Hempel et al., 2013). This might be partly due to the fact that sample sizes are usually quite small and the base rates of sexual recidivism considerably low (Aebi et al., 2011; Fanniff & Letourneau, 2012; Hempel et al., 2013; Miccio-Fonseca, 2016; Parks & Bard, 2006; Wijetunga et al., 2016; Worling et al., 2012). Furthermore, the rapid developmental changes in adolescents' risk factors make it difficult to derive long-term risk predictions, and thus call for the inclusion of different recidivism periods when investigating the predictive accuracies of risk assessment tools (Fanniff & Letourneau, 2012; Hempel et al., 2013; Miccio-Fonseca, 2016; Ralston & Epperson, 2013; Schlank et al., 2016; Viljoen et al., 2012). It is also worth noticing that, if risk assessment is conducted for the purpose of intervention planning in the course of initial court procedures, validation studies will have to rely on samples of JSOs who have not yet received any measure. This is rarely the case, as most

researchers have examined JSOs from treatment conditions (e.g., Martinez et al., 2015; Rajlic & Gretton, 2010; Viljoen et al., 2009; Viljoen et al., 2008; Worling et al., 2012), correctional facilities (e.g., Caldwell et al., 2008; Martinez et al., 2015; Parks & Bard, 2006), or at the time of release from a judicial measure (e.g., Wijetunga et al., 2016). Only few studies have included consecutive samples or JSOs on probation (e.g., Aebi et al., 2011; Ralston & Epperson, 2013; van der Put, van Vugt, Stams, Deković, & van der Laan, 2013; Worling & Langton, 2015). Moreover, we are not aware of any studies that have examined the direct and interactive effects of offense severity and/or the accumulation of adverse childhood experiences on the predictive accuracies of risk assessment instruments for JSOs.

The present study

Addressing the shortcomings of previous research mentioned above, the present study is the first to test the predictive accuracy of the J-SOAP II, the ERASOR, and the VRAG-R simultaneously in a large consecutive sample of JSOs while considering different recidivism intervals, the degree of offense severity, and the cumulative burden of ACEs.

Based on previous research and the purposes described by its authors, we expected the J-SOAP II and the ERASOR to show comparable predictive validities for sexual recidivism and the J-SOAP II to be more accurate in the prediction of nonsexual recidivism. Bearing in mind potential developmental changes during adolescence, we expected predictions to be more accurate with greater temporal proximity. The VRAG-R was assumed to predict sexual and nonsexual-violent reoffending, however, with more accuracy for re-offenses committed in adulthood (above age 18) than in adolescence. As the risk assessment tools were constructed on samples with rather high degrees of offense severity, we expected their predictive accuracy to be higher in JSOs with more severe offenses. Due to the limited empirical foundation, analyses concerning the effects of a cumulative ACE score on risk prediction were performed in exploratory manner.

Methods

Procedures

Between February and December 2015, court files of all adolescents were analyzed who had been convicted for a sexual offense apart from pornography (e.g., rape, sexual coercion, sexual molestation of a child, exhibitionism, sexual harassment) between January 2007 and September 2014 in 14 German-speaking cantons (states) in Switzerland. A forensic psychologist, a PhD candidate in forensic psychology, and a psychology student at the master's degree level conducted data assessment using a specifically developed, structured coding manual based on the Forensic Psychiatric Documentation System (Nedopil et al., 1986). In

addition to biographical and offense-related information, the coding manual contained the J-SOAP II, the ERASOR, the VRAG-R, a section to assess ACEs, and a separate chapter to record on sexual and nonsexual re-offenses (see below). Thirty court files were selected randomly under consideration of file content (inclusion of psychiatric/psychological expert opinion) and residential area (more or less than 10,000 residents) to be blindly double-rated by the two forensic psychologists in order to calculate interrater agreement (Cohen's κ for nominal and the intraclass correlation coefficient [ICC; two-way random model, single measure, absolute agreement] for metric variables). A threshold of .60 was defined for κ and ICC to indicate substantial agreement (Fleiss, 1981; Landis & Koch, 1977). Study procedures were authorized by the ethics committees of Zurich and northwest/central Switzerland (EKNZ; lead ethics committee: Zurich, EC-No. 2010-0483) as well as all juvenile justice authorities involved.

Sample

Court files of a total of 687 JSOs were coded. Because the J-SOAP II and the VRAG-R were constructed for risk assessment in male offenders, female JSOs were excluded (n = 14, 2.0%). Male JSOs who were younger than 12 years at the time of their first currently convicted sexual assault (n = 75, 11.1%) were excluded too because the J-SOAP II and the ERASOR were constructed for risk assessment in JSOs between 12 and 18 years old. In addition, one male JSO had to be excluded due to data loss. The final sample for the present study contained 597 male JSOs between 12 and 18 years at the time of their first currently convicted sexual assault (M = 14.47, SD = 1.57). Convicted sexual assaults included verbal/online forms of sexual harassment (e.g., sexual explicit chatting, taking/distributing sexual explicit photos/videos without permission; n = 150, 25.1%), sexual molestation in a face-to-face situation (e.g., exposing genitals, compelling victim to undress/present genitals, compelling victim to look at his or others' sexual activities; n = 324, 54.3%), nonconsensual touching (JSO touched the victim with sexual intent or had the victim touch him; n = 421, 70.5%), oral penetration (JSO conducted any oral sexual activity on the victim or had the victim conduct any oral sexual activity on him; n = 154, 25.8%), and/or vaginal/anal penetration (n = 125, 20.9%).

Excluded male JSOs younger than 12 years differed from included JSOs in the proportions of offenses including verbal/online harassment (13.3%), $\chi^2(1) = 5.11$, $p = .024$, offenses including face-to-face molestation (70.7%), $\chi^2(1) = 7.27$, $p = .007$, offenses including oral penetration (48.0%), $\chi^2(1) = 16.20$, $p \leq .001$, and offenses including vaginal/anal penetra-

tion (42.7%), $\chi^2(1) = 17.57$, $p \leq .001$. No differences were found in rates of offenses including nonconsensual touching (70.7%), $\chi^2(1) = 0.01$, $p = .979$.

Measures

J-SOAP II. The J-SOAP II (Prentky & Righthand, 2003) contains 28 items that reflect risk factors assigned to four subscales: (1) Sexual Drive/Preoccupation (items 1-8); (2) Impulsive/Antisocial Behavior (items 9-16); (3) Intervention (items 17-23); and (4) Community Stability/Adjustment (items 24-28). The first two and the last two subscales can be combined into two higher order scales displaying static and dynamic risk factors, respectively. Moreover, a J-SOAP total score is calculated by adding the risk estimates of all 28 items. Each item is to be rated between 0 and 2 with higher scores representing increased severity. Rating instructions are provided in the coding manual. Items were rated against lower risk when pertinent information from the court files was insufficient. For reasons of comparability with the other instruments, we only included the J-SOAP total score (*ICC* = .74) in our current analyses. We used the German translation of the J-SOAP II (Schmelzle, 2004) in the present study.

ERASOR. The ERASOR (version 2.0; Worling & Curwen, 2001) contains 25 items from the domains (1) Sexual Interests, Attitudes, and Behaviors (items 1-4); (2) Historical Sexual Assaults (items 5-13); (3) Psychosocial Functioning (items 14-19); (4) Family/Environmental Functioning (items 20-23); and (5) Treatment (items 26-28). However, these domains are rather descriptive in purpose and do not represent specific subscales. There is additional space to include one further risk factor which may be of specific importance for an individual JSO. Each item is to be rated as present, partially/possibly present, not present, or unknown. Rating instructions are provided in the coding manual. Items were rated against lower risk when pertinent information from the court files was insufficient. The overall risk is to be estimated in form of a clinical judgment (based on a personal weighting of given risk factors) as low (= 0), moderate (= 1), or high (= 2) (*ICC* = .60). We used the German translation of the ERASOR (Schmelzle, 2003) in the present study.

VRAG-R. The VRAG-R (G. T. Harris et al., 2015; Rice et al., 2013) contains 12 items that cover different risk factors for sexual/violent reoffending such as elementary school maladjustment, history of alcohol and drug problems, criminal history, or conduct disorder. Rating instructions are provided in the coding manual. Each item is rated with specifically developed weighting with an overall range from -6 (item 12) to +6 (items 9 and 12), in which higher scores represent increased severity. Items were rated against lower risk when pertinent information from the court files was insufficient. When raters omitted to score an item, a pro-

rating procedure was applied as proposed by the VRAG-R's authors (G. T. Harris et al., 2015). The sum of item ratings represents the VRAG-R total score (*ICC* = .92) which was used in the present study. We did not use cut-off-based risk categories for the sake of comparability with the other instruments, and because such risk categories have not yet been validated in adolescent samples.

In the adult version of the VRAG-R, antisociality (item 12) is represented by Facet 4 of the Psychopathy Checklist-Revised (Hare, 2003). However, as suggested by the authors (G. T. Harris et al., 2015), we used Facet 4 of the Psychopathy Checklist Youth Version (Forth, Kosson, & Hare, 2003) instead for our adolescent sample. Because no translation is yet accessible for the VRAG-R, we used the original version in the present study.

Offense severity. We assessed offense severity by means of a scale developed by Aylwin et al. (2000), which ranks an offender's most serious sexual assault according to specific offense characteristics independent of their effects on the victim(s). The original coding contains six levels with (1) obscene phone calls, voyeurism, and clothed fondling; (2) exhibitionism, frotteurism, and clothes-off fondling; (3) oral and/or simulated sex; (4) attempt/performance of vaginal sex; (5) attempt/performance of anal sex or gang rape; and (6) use of augmented (physical and psychological) force. In order to differentiate between hands-off and hands-on assaults, we divided the first category into two sections reflecting non-contact (e.g., obscene phone calls, sexual harassment via Internet) and contact (e.g., clothed fondling) assaults (Aebi et al., 2011). Thus, the final scale used in the present study contained seven levels indicating elevating degrees of offense severity (*ICC* = .79).

Adverse childhood experiences. Adverse childhood experiences (ACEs) that had occurred before a JSO's first currently convicted sexual assault were assessed following the 10 categories of the Maltreatment and Abuse Chronology of Exposure (MACE) scale (Isele et al., 2014; Teicher & Parigger, 2015): verbal abuse, nonverbal emotional abuse, physical abuse, emotional abuse by peers, physical bullying, emotional neglect, physical neglect, witnessing violence between caretakers, witnessing violence against siblings, and sexual victimization. We further relied on the Child Sexual Abuse Questionnaire (CSAQ; Mohler-Kuo et al., 2014) to amplify information on histories of sexual victimization by including items related to a range of non-contact (online) assaults (because of the frequent appearance of non-contact/online assaults among adolescents; Mohler-Kuo et al., 2014). An ACE-category was assured when any pertinent experience was recorded in the court files. Assured ACE-categories were counted to create a total ACE score (potential range: 0 – 10; *ICC* = .86). MACE and CSAQ were proven to be reliable and valid tools for the assessment of ACEs in

self-reports (Aebi, Landolt, et al., 2015; Isele et al., 2014; Teicher & Parigger, 2015). The present interrater agreement supports their use in file analyses.

Criminal recidivism. Two sources were used to derive information on criminal recidivism. First, we included official re-offenses registered by the Swiss Federal Office of Justice and the Swiss Federal Statistical Office. Second, we additionally assessed any delinquent behavior (meeting the criteria to be potentially charged under Swiss penal law) which a JSO had shown after the current conviction and which was recorded in the case files but may not have led to new charges and/or convictions. By including such information, e.g., from probation reports or therapeutic documentations, we aimed to approximate the actual crime prevalence in the dark field (e.g., Thornberry & Krohn, 2000). For the exclusion of potential bias, re-offense data were assessed after coding all other variables of interests. Three categories of criminal recidivism were considered: (1) sexual recidivism (i.e., any sexually offending behavior except illegal pornography use); (2) nonsexual-violent recidivism (e.g., violence-related threat, bodily assault, affray, robbery); and (3) general recidivism (including the first two recidivism categories as well as further contraventions such as drug-related offenses, theft, or property damage). Each recidivism category showed substantial interrater agreement (all $\kappa > .60$). In order to examine short- and long-term predictions of risk assessment tools, recidivism was examined 0.5 years (183 days) and 3 years (1095 days) after the current conviction. The recidivism period of 0.5 years is in agreement with the proposed time interval for re-assessing re-offense risk with the J-SOAP II and the ERASOR (Prentky et al., 2010; Viljoen et al., 2009). The maximum of 3 years was chosen because recent research has indicated that re-offense rates tended to stagnate at this time (Caldwell, 2016). We additionally considered re-offenses exclusively conducted in adulthood (above age 18) to test the recommendation to use the VRAG-R for adolescent risk assessment related to adult recidivism (G. T. Harris et al., 2015).

Statistical Analyses

Analyses were conducted in IBM SPSS23. Parametric and non-parametric descriptive statistics included χ^2-tests, Pearson-, and Spearman-Rank correlations. The general level of significance was set at $p \leq .05$. *Z*-transformed scores were used for comparative analyses to account for scaling differences and to facilitate interpretation.

ROC analyses. The predictive accuracy of risk assessment tools was examined using Receiver Operator Characteristic (ROC) curves (e.g., Mossman, 1994). ROC curves describe an instrument's rate of true positives (sensitivity) in relation to its rate of false positives (1-specificity) for each possible score on the instrument's scale. The area under the curve (AUC)

represents an indicator of the instrument's predictive accuracy, which allows comparison with other risk assessment tools. AUCs reflect the probability that the risk score of a randomly chosen reoffender would be higher than the risk score of a randomly chosen non-reoffender. They have been recommended as "preferred measure of predictive or diagnostic accuracy in forensic psychology and psychiatry" (Rice & Harris, 2005, p. 618), especially for risk assessment tools without cut-off values (Singh, 2013). AUCs are base-rate independent and irrespective of tendencies against or toward type 1 and 2 errors in clinical evaluations (Mossman, 1994). We followed recommendations by Rice and Harris (2005) to interpret AUC values analogous to Cohen's (Cohen, 1988) effect size *d*: small (*AUC* = .556-.639; *d* = .20-.50), moderate (*AUC* = .639-.714; *d* = .50-.80), and large (*AUC* ≥ .714; *d* ≥ .80). Hanley and McNeil's (1983) non-parametric approach was used the compare the instruments' AUC values. Z-values above 1.96 or below -1.96 represented significant differences.

Cox regression. Predictive validity was further examined using Cox-regression. For each recidivism category (sexual, nonsexual-violent, general), time at risk (number of days between the current conviction and the first re-offense) was included as dependent variable. When a JSO did not re-offend, his time at risk was set at the maximum of 1095 days for the 3-year observation period. The assumption of proportional hazard (time-independent influence of covariates on individual hazard) was considered as confirmed when *p*-values exceeded the threshold of .05. Multicollinearity was assumed with variance inflation factors (VIFs) above 10 and tolerance scores below .10 (Hair et al., 1995).

Results

Descriptive Findings

Risk assessment tools. In the total sample (*N* = 597), the J-SOAP II total score (Cronbach's α = .91) ranged between 0 and 48 (*M* = 14.91, *SD* = 10.24). The ERASOR assigned 260 JSOs (43.6%) to low, 242 (40.5%) to moderate, and 95 (15.9%) to high recidivism risk. The VRAG-R score (Cronbach's α = .73) ranged from -23 to 34 (*M* = -10.16, *SD* = 11.13). Offense severity levels ranged from 1 to 7 (*Mdn* = 3), and the ACE score ranged from 0 to 10 (*M* = 1.74, *SD* = 2.17). Correlations among scores are presented in Table 15.

Recidivism rates. Rates of sexual, nonsexual-violent, and general recidivism within 0.5 years, 3 years, and above age 18 are shown in Table 16. All JSOs were followed for 0.5 years, 514 (86.1%) for 3 years, and 550 (92.1%) until adulthood (above age 18). Compared with reliance on official re-offenses only, the consideration of case file information which included non-registered re-offenses led to increased prevalence rates of (a) sexual recidivism

Table 15

Pearson's/Spearman-Rank Correlations Among Risk Assessment Instruments, Offense Severity Scale, and Cumulated Adverse Childhood Experiences

	J-SOAP II	ERASOR	VRAG-R	Offense Severity	ACE Score
J-SOAP II	1	.818***/.809***	.700***/.670***	.435***/.354***	.656***/.635***
ERASOR		1	.655***/.633***	.304***/.317***	.556***/.587***
VRAG-R			1	.231***/.232***	.508***/.508***
Offense Severity				1	.275***/.307***
ACE Score					1

Note. Total $N = 597$. ACE = adverse childhood experiences.
*** $p \leq .001$.

Table 16

Rates of Sexual, Nonsexual-Violent, and General Recidivism Based on Different Time Periods and Sources of Information

	Recidivism rates: *n* (%)								
	Within 0.5 years (*n* = 597)			Within 3 years (*n* = 514)			Above age 18 (*n* = 550)		
	Total	Case files	Registered	Total	Case files	Registered	Total	Case files	Registered
Sexual	21 (3.5)	19 (3.2)	6 (1.0)	38 (7.4)	34 (6.6)	16 (3.1)	17 (3.1)	11 (2.0)	9 (1.6)
Nonsexual-violent	48 (8.0)	33 (5.5)	25 (4.2)	95 (18.5)	67 (13.0)	63 (12.3)	48 (8.7)	14 (2.5)	42 (7.6)
General	129 (21.6)	95 (15.9)	68 (11.4)	223 (43.4)	145 (28.2)	177 (34.4)	179 (32.5)	71 (12.9)	160 (29.1)

Note. Total $N = 597$.

within all observation periods; (b) nonsexual-violent recidivism within 0.5 and 3 years; and (c) general recidivism within 0.5 years.

Predictive accuracy

Results of the ROC analyses for sexual, nonsexual-violent, and general recidivism at 0.5 and 3 years after the current conviction as well as above age 18 are displayed in Table 17. J-SOAP II and ERASOR showed large predictive values for juvenile sexual recidivism in both the 0.5 and the 3 year observation periods, whereas the predictive value of the VRAG-R fell in the moderate range. All instruments showed moderate predictive values for sexual recidivism above age 18. Subsequent analyses revealed that the ERASOR predicted sexual recidivism within 3 years significantly better than the VRAG-R ($z = 2.15$).

Nonsexual-violent recidivism was predicted well by the J-SOAP II and the VRAG-R throughout all recidivism periods. The ERASOR showed moderate predictive values for nonsexual-violent recidivism. Subsequent analyses revealed that the J-SOAP II predicted nonsexual-violent recidivism consistently better than the ERASOR (0.5 years: $z = 2.28$; 3 years: $z = 2.92$; above age 18: $z = 2.20$). The VRAG-R performed better than the ERASOR concerning nonsexual-violent recidivism above age 18 ($z = 2.50$).

General recidivism within 0.5 years was predicted well by the J-SOAP II and the VRAG-R. Yet, the VRAG-R showed moderate predictive validities for recidivism within 3 years and above age 18, whereas the J-SOAP II showed moderate predictive validity for recidivism within 3 years and small predictive validity for recidivism above age 18. The ERASOR predicted general recidivism with moderate accuracies for the 0.5 and 3 year observation periods but with small accuracy for re-offenses committed above age 18. Subsequent analyses revealed that the J-SOAP II predicted general recidivism within 3 years significantly better than the ERASOR ($z = 2.07$).

Effects of offense severity and cumulated ACEs

Tables 18-20 display the results of univariate and multivariate Cox regressions for the J-SOAP II, ERASOR, and VRAG-R, respectively. The proportional hazard assumption was confirmed for all variables (all $p > .05$). No multicollinearity issues emerged. Regression models supported the findings from previous ROC analyses: Risk scores on each instrument were positively related to (time to first) reoffending in all models. Concerning the prediction of sexual recidivism, (marginally) significant negative interactions between risk scores and offense severity were found for the J-SOAP II and the VRAG-R, but not for the ERASOR. Significant negative interactions between risk scores and the cumulated ACE score were found for VRAG-R concerning sexual recidivism and for the J-SOAP II concerning sexual

and general recidivism. When both interactions were concertedly considered in one regression model (model 5), the interaction effects of risk scores and ACE scores remained significant, and ACE scores usually maintained their main effects on recidivism risk.

Table 17

AUC Values From ROC Analyses Including Sexual, Nonsexual-Violent, and General Recidivism for the Three Risk Assessment Instruments at Different Recidivism Periods

Time period	Recidivism category	J-SOAP II			ERASOR			VRAG-R		
		AUC	95% CI		*AUC*	95% CI		*AUC*	95% CI	
			LL	*UL*		*LL*	*UL*		*LL*	*UL*
Within 0.5 years[a]	Sexual	.738***	.635	.841	.762***	.673	.851	.666*	.554	.777
	Nonsexual-violent	.750***	.680	.821	.692***	.613	.772	.726***	.641	.810
	General	.738***	.691	.785	.705***	.656	.753	.733***	.683	.782
Within 3 years[b]	Sexual	.740***	.662	.817	.780***	.707	.854	.694***	.599	.790
	Nonsexual-violent	.767***	.716	.818	.711***	.656	.766	.734***	.674	.794
	General	.713***	.669	.758	.680***	.633	.726	.718***	.673	.763
Above age 18[c]	Sexual	.701**	.571	.831	.703**	.572	.834	.688**	.528	.849
	Nonsexual-violent	.758***	.686	.829	.707***	.632	.782	.784***	.717	.852
	General	.632***	.583	.682	.635***	.585	.685	.660***	.611	.709

Note. AUC = area under the curve; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.
[a]$n = 597$, [b]$n = 514$, [c]$n = 550$.
***$p \leq .001$, **$p \leq .01$, *$p \leq .05$.

Table 18

Univariate and Multivariate Cox Regressions Concerning the Prediction of Sexual, Nonsexual-Violent, and General Recidivism of the J-SOAP II

Indicators	Recidivism category								
	Sexual			Nonsexual-violent			General		
		95% CI			95% CI			95% CI	
	HR	*LL*	*UL*	*HR*	*LL*	*UL*	*HR*	*LL*	*UL*
Univariate Models									
J-SOAP II	1.97***	1.50	2.58	2.18***	1.84	2.60	1.73***	1.55	1.94
Multivariate Models									
Model 1									
J-SOAP II	2.07***	1.55	2.76	2.40***	1.99	2.89	1.79***	1.59	2.01
Severity score	0.86	0.62	1.19	0.76**	0.61	0.93	0.90	0.78	1.02
Model 2									
J-SOAP II	2.15***	1.61	2.86	2.41***	2.00	2.89	1.79***	1.59	2.02
Severity score	1.11	0.76	1.63	0.80	0.62	1.04	0.90	0.78	1.03
Interaction (J-SOAP II x Severity score)	0.70*	0.51	0.95	0.93	0.77	1.11	1.00	0.89	1.12
Model 3									
J-SOAP II	1.87***	1.29	2.71	1.97***	1.56	2.48	1.61***	1.39	1.87
ACE score	1.07	0.76	1.51	1.16	0.94	1.43	1.11	0.96	1.28
Model 4									
J-SOAP II	2.21***	1.51	3.24	2.07***	1.62	2.63	1.67***	1.44	1.95
ACE score	1.55*	1.05	2.30	1.30*	1.00	1.70	1.23*	1.04	1.44
Interaction (J-SOAP II x ACE score)	0.69*	0.52	0.92	0.90	0.77	1.06	0.89*	0.80	0.99
Model 5									
J-SOAP II	2.40***	1.61	3.58	2.27***	1.77	2.92	1.74***	1.49	2.04
Severity score	1.06	0.71	1.61	0.77^{+}	0.59	1.00	0.86*	0.74	1.00
ACE score	1.50*	1.00	2.24	1.32*	1.01	1.73	1.26**	1.06	1.48
Interaction (J-SOAP II x Severity score)	0.72	0.51	1.02	0.96	0.79	1.18	1.04	0.92	1.18
Interaction (J-SOAP II x ACE score)	0.71*	0.53	0.96	0.89	0.75	1.06	0.87*	0.77	0.98

Note. *HR* = hazard ratio, CI = confidence interval, *LL* = lower limit, *UL* = upper limit.
$^{+}p \leq .06$, *$p \leq .05$, **$p \leq .01$. ***$p \leq .001$.

Table 19

Univariate and Multivariate Cox Regressions Concerning the Prediction of Sexual, Nonsexual-Violent, and General Recidivism of the ERASOR

Indicators	Recidivism category								
	Sexual			Nonsexual-violent			General		
		95% CI			95% CI			95% CI	
	HR	*LL*	*UL*	*HR*	*LL*	*UL*	*HR*	*LL*	*UL*
Univariate Models									
ERASOR	2.65***	1.91	3.67	2.07***	1.71	2.50	1.70***	1.51	1.91
Multivariate Models									
Model 1									
ERASOR	2.74***	1.96	3.81	2.15***	1.77	2.62	1.73***	1.53	1.96
Severity score	0.86	0.63	1.18	0.85	0.69	1.04	0.93	0.82	1.06
Model 2									
ERASOR	2.71***	1.94	3.77	2.13***	1.75	2.59	1.73***	1.53	1.95
Severity score	1.04	0.67	1.63	0.90	0.71	1.15	0.94	0.82	1.08
Interaction (ERASOR x Severity score)	0.82	0.58	1.16	0.91	0.75	1.12	0.97	0.86	1.10
Model 3									
ERASOR	2.59***	1.79	3.76	1.73***	1.38	2.16	1.53***	1.33	1.76
ACE score	1.04	0.77	1.39	1.36***	1.13	1.63	1.21**	1.07	1.37
Model 4									
ERASOR	2.62***	1.81	3.78	1.77***	1.41	2.21	1.54***	1.34	1.77
ACE score	1.21	0.75	1.94	1.47**	1.16	1.86	1.28***	1.10	1.49
Interaction (ERASOR x ACE score)	0.88	0.64	1.22	0.92	0.78	1.09	0.93	0.83	1.04
Model 5									
ERASOR	2.64***	1.83	3.82	1.81***	1.44	2.28	1.57***	1.36	1.81
Severity score	1.01	0.64	1.61	0.85	0.66	1.10	0.91	0.79	1.05
ACE score	1.20	0.74	1.95	1.50***	1.18	1.91	1.30***	1.12	1.51
Interaction (ERASOR x Severity score)	0.84	0.59	1.19	0.92	0.74	1.14	0.99	0.86	1.12
Interaction (ERASOR x ACE score)	0.91	0.66	1.26	0.92	0.78	1.10	0.92	0.82	1.04

Note. *HR* = hazard ratio, CI = confidence interval, *LL* = lower limit, *UL* = upper limit.
*$p \leq .05$, **$p \leq .01$. ***$p \leq .001$.

Table 20

Univariate and Multivariate Cox Regressions Concerning the Prediction of Sexual, Nonsexual-Violent, and General Recidivism of the VRAG-R

Indicators	Recidivism category								
	Sexual			Nonsexual-violent			General		
		95% CI			95% CI			95% CI	
	HR	*LL*	*UL*	*HR*	*LL*	*UL*	*HR*	*LL*	*UL*
Univariate Models									
VRAG-R	1.64***	1.30	2.07	1.96***	1.69	2.27	1.65***	1.50	1.83
Multivariate Models									
Model 1									
VRAG-R	1.65***	1.29	2.11	2.06***	1.75	2.41	1.68***	1.51	1.87
Severity score	0.97	0.71	1.33	0.84	0.69	1.03	0.94	0.83	1.07
Model 2									
VRAG-R	1.75***	1.37	2.24	2.12***	1.80	2.49	1.74***	1.56	1.95
Severity score	1.14	0.81	1.61	0.92	0.73	1.17	0.98	0.86	1.12
Interaction (VRAG-R x Severity score)	0.79^{+}	0.62	1.01	0.90	0.78	1.04	0.92	0.83	1.01
Model 3									
VRAG-R	1.43*	1.08	1.89	1.71***	1.44	2.04	1.51***	1.35	1.70
ACE score	1.33^{+}	1.00	1.77	1.37***	1.15	1.63	1.23***	1.09	1.39
Model 4									
VRAG-R	1.70***	1.28	2.26	1.76***	1.45	2.13	1.57***	1.39	1.78
ACE score	1.64***	1.21	2.22	1.42***	1.16	1.75	1.29***	1.13	1.48
Interaction (VRAG-R x ACE score)	0.74*	0.59	0.94	0.95	0.83	1.10	0.92	0.84	1.01
Model 5									
VRAG-R	1.77***	1.32	2.38	1.87***	1.53	2.28	1.63***	1.43	1.86
Severity score	1.06	0.73	1.53	0.86	0.67	1.09	0.94	0.82	1.08
ACE score	1.61**	1.18	2.21	1.42**	1.14	1.77	1.29***	1.12	1.48
Interaction (VRAG-R x Severity score)	0.82	0.63	1.08	0.92	0.79	1.07	0.95	0.85	1.05
Interaction (VRAG-R x ACE score)	0.77*	0.61	0.97	0.98	0.85	1.14	0.93	0.84	1.03

Note. *HR* = hazard ratio, CI = confidence interval, *LL* = lower limit, *UL* = upper limit.
$^{+}p \leq .06$, $*p \leq .05$, $**p \leq .01$. $***p \leq .001$.

Discussion

The current study is the first comparison of the predictive validities of the J-SOAP II, ERASOR, and VRAG-R in a consecutive sample of JSOs accounting for different recidivism periods, offense severities, and histories of ACEs. Overall, the present risk assessment tools proved to be valid for the prediction of criminal recidivism according to their intended purposes in a heterogeneous sample of JSOs. Yet, predictive validity was confined by elevated offense severity and, especially, by increasing numbers of ACEs.

Recidivism rates in the present sample

Recidivism rates for sexual, nonsexual-violent, and general recidivism were comparable to those found in previous Swiss and international samples (e.g., Aebi et al., 2011; Caldwell, 2016) and indicated that JSOs more often re-offend with nonsexual criminal conduct than sexual assaults. The inclusion of non-registered reoffending contributed to elevated rates of recidivism with temporal proximity to the current conviction, especially in terms of sexual reoffending[6]. Recidivism studies should therefore not rely only on officially recorded re-offenses but include other sources of information (e.g., from case files or direct self-reports) to approximate the actual recidivism rates in the dark field (e.g., Thornberry & Krohn, 2000).

Predictive validities of risk assessment instruments

J-SOAP II and ERASOR. Overall, the performances of the J-SOAP II and the ERASOR in the present study appeared to be better than those reported in most previous studies (e.g., Aebi et al., 2011; Martinez et al., 2015; Quenzer & Dahle, 2010; Viljoen et al., 2009; Viljoen et al., 2012; Viljoen et al., 2008; Worling & Langton, 2015). This finding may be attributable to two facts: First, the present sample was more heterogeneous in terms of offense characteristics and recidivism risk than previous JSO samples. Increased sample homogeneity (e.g., due to pre-selection by offense characteristics or treatment setting) can cause reduction in AUC estimates (Howard, 2016). Second, the consideration of both registered and non-registered re-offenses may have contributed to higher accuracy ratings. In fact, examining the relations of J-SOAP II scores and non-registered sexual recidivism in a sample of adolescents involved in the child welfare system, Prentky et al. (2010) found AUC values of up to .83.

[6] Rates of registered nonsexual-violent and general recidivism were sometimes higher than those from case file information for re-offenses committed up to 3 years and/or above age 18. This finding may be influenced by the fact that case files may not have covered long-term criminal conduct because they contained information with greater temporal proximity to the initial offense.

In line with our expectations, the J-SOAP II proved to be valid in predicting sexual and nonsexual recidivism 0.5 to 3 years after the current conviction, whereas the ERASOR showed comparable (slightly higher) accuracy values for the prediction of sexual recidivism but lower accuracy values for nonsexual recidivism. Indeed, the J-SOAP II significantly outperformed the ERASOR in the prediction of general reoffending within a 3-year recidivism period. For each single assessment tool, predictive accuracies did not notably vary between 0.5-year- and 3-year recidivism periods, indicating that both the J-SOAP II and the ERASOR may be used for short- and long-term predictions. However, when only considering those reoffenses that JSOs had committed above age 18, we found that the predictive validity of the J-SOAP II was somewhat weaker, although the effect for nonsexual-violent recidivism was still large. In contrast, the ERASOR only showed low to moderate predictive effects for any category of recidivism above age 18, underscoring that its use for the prediction of reoffending in adulthood remains questionable.

For the interpretation of our results, one needs to bear in mind that we could not address changes in risk factors potentially influencing recidivism risk that might have occurred after risk assessment was completed. We therefore recommend not diverging from previous researchers' advice to periodically re-assess recidivism risk (Prentky et al., 2010; Viljoen et al., 2009).

VRAG-R. In the present first examination of the VRAG-R in a JSO sample, the instrument proved to be more accurate in predicting nonsexual recidivism than sexual recidivism. Predictive effects were similar to those found in previous adult sex offender and general juvenile offender samples relating to violent reoffending (G. T. Harris et al., 2015; Rice et al., 2013). As to a direct comparison, the ERASOR significantly outperformed the VRAG-R in the prediction of sexual recidivism within 3 years. Yet, the VRAG-R significantly outperformed the ERASOR in the prediction of nonsexual-violent recidivism in adulthood. Although its effects were slightly higher for sexual and nonsexual-violent recidivism exclusively committed above age 18, the moderate to large predictive effects of the VRAG-R for sexual recidivism and nonsexual-violent/general recidivism within the 0.5 and 3-year recidivism periods argue in favor of its use in juvenile offender samples not only for the prediction of adult recidivism but also for predicting more proximate reoffending.

The influence of offense severity and adverse childhood experiences on risk prediction

In case of the J-SOAP II and the VRAG-R, predictive accuracy for sexual recidivism appeared impeded when offense severity increased. These findings were unexpected in view of the fact that both instruments were developed in samples showing rather severe criminal

conduct. However, elevated offense severity in JSOs has been associated with a range of disadvantageous factors (e.g., behavioral problems and prior delinquency; Leroux et al., 2016), which may contribute to increased risk of reoffending but may not be adequately covered by the J-SOAP II and the VRAG-R. In contrast, the ERASOR may not have been influenced by offense severity as much as the other instruments because its SPJ-approach, and thus the clinical impression underlying the final rating, may have implicitly included such factors.

In the present sample, increased offense severity was associated with elevated rates of ACEs. This finding is in line with previous research that found multiply burdened JSOs to commit more severe offenses than JSOs with little or no ACE occurrence (e.g., Barra, Bessler, et al., 2017a; D. L. Burton, 2003). At the same time, the number of ACEs was associated with elevated recidivism risk, underscoring the role of ACEs in the incidence of criminal persistence in JSOs (e.g., Carpentier & Proulx, 2011; Mallie et al., 2011). Moreover, our findings emphasize that risk assessment is particularly challenging in JSOs who are highly burdened with ACEs: Predictive validities of the J-SOAP II and the VRAG-R concerning sexual recidivism decreased with increasing rates of ACEs, even when the interaction with offense severity was accounted for. In case of the J-SOAP II, the prediction of general recidivism was also impeded with increasing ACE scores. That cumulated ACEs especially influenced the predictive value of the J-SOAP II was surprising because among the three risk assessment tools, the J-SOAP II contains the most items that reflect single types of childhood adversity. Hence, it appears that the consideration of single ACE categories is not sufficient in order to reflect the risk of childhood adversity for criminal recidivism, but a more comprehensive consideration of the cumulative effects of intra- and extra-familial ACEs may be beneficial. Again, the predictive effects of the ERASOR remained rather unaffected by ACEs, indicating that a JSO's ACE history may have been included in the ERASOR's SPJ-based rating.

Actuarial vs. SPJ-based approaches

In total, the present findings underscore that SPJ-based approaches are of particular importance for risk prediction in JSOs. The actuarial (mechanical) summation of empirically derived risk factors to predict criminal recidivism (in case of the J-SOAP II and the VRAG-R in the present study) was challenged when other risk factors, especially ACEs, were taken into account. Bearing in mind the lack of reliability and validity of UCJ approaches (Brown & Singh, 2014), we therefore recommend using existing risk assessment instruments for guidance toward a clinical estimation of risk (in terms of SPJ), but relying neither on their isolated scores nor one's own clinical impression alone.

Strengths and limitations

The present study overcame some of the limitations noted in previous studies on the predictive validity of risk assessment instruments in JSOs. First, we examined a large consecutive, court-based sample of JSOs. Thus, JSOs were not preselected but represented a heterogeneous sample in terms of recidivism risk, offense characteristics, and ACEs. We aimed at approximating the dark figure of juvenile crime by not relying only on recidivism data from official registers but also including reoffending that had not been legally charged. Analyses considered different recidivism periods to examine short- and long-term risk prediction and were based on different methodological approaches in order to confirm our findings.

However, the present study is not without limitations. Despite considering both official and non-registered reoffending, we cannot rule out that some re-offenses may not have been identified. Because investigated case files had not been originally prepared for research purposes, information on some variables may have been limited, leading to a potential underestimation of risk factors. The present interrater agreement, however, supports the use of all variables of interest in the present study. Finally, predictive validity was defined in terms of discrimination whereas calibration was not investigated. Although often found in studies in this area, this approach has been considered as fragmentary in evaluating the predictive accuracy of risk assessment tools (Singh, 2013). However, no reliable measures for calibration are available to date for instruments without specific cut-off values like those used in the present study (Singh, 2013). Future research may contribute to the field by examining whether the cut-off values of the VRAG-R for adult offenders are applicable to juvenile offenders too, and whether similar cut-off values can be derived for other risk assessment tools like the J-SOAP II. Furthermore, previous research has pointed to somewhat different accuracies of risk assessment instruments with regard to theoretically defined JSO subsamples (e.g., JSOs with and without histories of general delinquent behaviors; Rajlic & Gretton, 2010). Taking into consideration the growing interest in empirically derived subtypes of delinquent youth (e.g., Barra, Bessler, et al., 2017a; Mulder et al., 2012), research on the performance of risk assessment tools in distinct JSO-subtypes appears promising in order to clarify which instruments are of specific usefulness for particular JSOs.

Conclusions

The present study supports the use of the J-SOAP II, the ERASOR, and the VRAG-R in risk prediction of JSOs. Overall, the instruments showed satisfying predictive validity in the risk domains they were constructed for. However, as some instruments outperformed others depending on re-offense category and recidivism period, clinicians and researchers should

choose risk assessment tools with forethought. Based on our findings, the ERASOR appears to be best suited for the prediction of sexual reoffending within 0.5 and 3 years, whereas the J-SOAP II may be applicable for the prediction of both sexual and nonsexual-violent recidivism within these observation periods as well as nonsexual-violent recidivism above age 18. The VRAG-R may not be as suitable for the prediction of sexual reoffending as the ERASOR and J-SOAP II, but may show potential strengths in predicting nonsexual-violent recidivism, particularly concerning re-offenses committed above age 18.

In addition to the degree of offense severity, a JSO's history of cumulated ACEs may particularly impede the validity of risk assessment instruments, especially concerning sexual recidivism. The consideration of ACEs in risk assessment is of major importance in view of the fact that (a) elevated ACE scores are associated with increased recidivism risk, while (b) elevated ACE scores complicate risk prediction. Therefore, the comprehensive consideration of an adolescent's developmental history is necessary in judicial and clinical procedures involving JSOs in order to offer them interventions that match their recidivism risks and individual needs (see, e.g., the risk-need-responsivity model; Andrews & Bonta, 2010). For instance, approaches of trauma-informed care may help a JSO to overcome dysfunctional cognitions and behavior styles traced back to experienced adversity, and thus contribute to the public safety by reducing an individual's risk of reoffending (e.g., Levenson, 2014).

Taken together, the consideration and implementation of both offense severity and cumulated ACEs may pose a major challenge for the construction and enhancement of future risk assessment instruments for JSOs. Although the risk assessment tools examined in the current study appeared (on the whole) to be valid indicators of recidivism risk in the present JSO sample, risk assessment and related consequences for an individual JSO must not be – at this juncture – based on such instruments alone but must integrate a comprehensive consideration of a JSO's pathway to delinquency and history of early adversity.

C. GENERAL DISCUSSION

The present dissertation thesis has contributed to the scientific knowledge on the occurrence, maintenance, and prediction of crime in JSOs. Thereby, the overall goal was to pay regard to the manifold heterogeneity among JSO samples and gain additional proficiency regarding the role of various offense characteristics and, in particular, the specific and shared influences of a wide range of intra- and extra-familial ACEs. Table 21 summarizes the main research questions, study procedures, and results of the four conducted studies. In the following, study findings will be embedded into the current scientific debate on sexual offending, highlighting the strengths and limitations of the present studies and deriving implications for research, judicial, clinical, and policy professionals that aim at preventing the incidence and retention of sexually abusive behaviors among adolescents.

1. Reflection of Empirical Findings

1.1 The heterogeneity of JSOs

The present thesis both supports and enhances theoretical assumptions and empirical findings of previous research on juvenile sexual offending. Most considerably, it underscores the oft-cited heterogeneity among JSOs that impedes the deduction of general implications for research, treatment, and policy-related topics regarding sexual aggression among minors (e.g., Andrade et al., 2006; Becker & Hicks, 2003; Fanniff & Kimonis, 2014; Van Wijk et al., 2006). The four present studies reinforce prior empirical results regarding the variety of personal and offense characteristics found in JSO samples (e.g., Aebi et al., 2012; Bijleveld & Hendriks, 2003; Gunby & Woodhams, 2010; Hunter et al., 2000; Miccio-Fonseca & Rasmussen, 2009; Veneziano & Veneziano, 2002) and underscore previous mentions about the need to examine specific JSO-subtypes rather than considering them as a homogenous group (Murphy et al., 2016).

1.2 The relevance of ACEs in juvenile sexual offending

The present studies support previous findings as to the high prevalence of ACEs in JSO samples (e.g., Seto & Lalumière, 2010) and highlight that a considerable number of JSOs is burdened with a multiplicity of ACEs (Rasmussen, 2013). Results further indicate that ACEs appear to play a role in the occurrence of different offense characteristics (Barra, Bessler, et al., 2017a), to influence the probability of reoffending (Barra, Bessler, et al., 2017c), and to limit the predictive accuracy of instruments designed to assess risk of criminal recidivism (Barra, Bessler, et al., 2017b). Overall, the present findings go along with the theoretical approaches introduced in Chapter A that highlighted the frequent occurrence of

Table 21

Summary of the Four Empirical Studies Conducted in the Framework of the Present Dissertation Thesis

Study 1	**Patterns of adverse childhood experiences in juveniles who sexually offended**
Main research question	Can distinct empirically derived JSO-subtypes based on individual ACE patterns explain the heterogeneity of JSOs with regard to offense and victim characteristics of the sexual index offense?
Sample	*N* = 322 male JSOs, aged 8–18 years (*M* = 14.14, *SD* = 1.94)
Measures	10 ACE categories; 7 offense characteristics; 4 covariates
Main analyses	LCA, binary logistic/ordinal regression
Main results	▪ high prevalence of ACE burden among JSO sample ▪ 5 subtypes differing on sorts and numbers of ACEs: low ACEs, peer-related ACEs, neglect, family-related ACEs, multiple ACEs ▪ differential associations of subtypes with various offense characteristics
Study 2	**Type and timing of maltreatment influence criminal persistence in sexually abusive adolescents**
Main research question	Can distinct empirically derived JSO-subtypes based on time-dependent individual ACE patterns explain the heterogeneity of JSOs with regard to sexual and nonsexual criminal recidivism?
Sample	*N* = 278 male JSOs, aged 12–18 years (*M* = 14.64, *SD* = 1.58)
Measures	5 ACE (maltreatment) categories within 3 time periods (aged 0-5 years, 6-11 years, and/or 12-18 years); sexual and nonsexual re-offenses; 4 covariates
Main analyses	LCA, LTA, binary logistic regression
Main results	▪ 3 maltreatment subtypes at each time period: low, neglectful, and severe maltreatment ▪ severe maltreatment associated with criminal recidivism independent of timing ▪ long-term/enduring maltreatment (especially lack of supervision) most influential for criminal recidivism
Study 3	**Criminal persistence and psychosocial adversity in empirically derived offense-related subtypes of sexually abusive adolescents**
Main research question	Can distinct empirically derived JSO-subtypes based on individual offense patterns explain the heterogeneity of JSOs with regard to psychosocial adversity, ACEs as well as sexual and nonsexual criminal recidivism?
Sample	*N* = 670 male JSOs, aged 8–18 years (*M* = 14.49, *SD* = 1.94) Subsample: *N* = 321 male JSOs, aged 8.5–18.5 years (*M* = 14.13, *SD* = 1.93)
Measures	10 offense characteristics; 10 variables representing psychosocial adversity; 10 ACEs; sexual and nonsexual re-offenses; 3 covariates
Main analyses	LCA, Cox regression
Main results	▪ 4 offense-related subtypes: verbal/online offenders, touch offenders, severe peer/adult offenders, and severe child offenders ▪ JSOs from the severe peer/adult and child offender subtypes showed elevated rates of psychosocial adversity, ACEs, and risk of reoffending ▪ Binary distinction between peer/adult and child offenders does not sufficiently reflect the heterogeneity among JSOs
Study 4	**Testing the validity of criminal risk assessment tools in sexually abusive youth**
Main research question	Can current risk assessment instruments accurately predict whether a JSO will reoffend, and may the heterogeneity of JSOs with regard to offense characteristics and ACEs impact these predictions?
Sample	*N* = 597 male JSOs, aged 12-18 years (*M* = 14.47, *SD* = 1.57)
Measures	J-SOAP II; ERASOR; VRAG-R; offense severity; 10 ACEs; sexual, nonsexual-violent, and general re-offenses within 0.5 years, 3 years, and above age 18
Main analyses	ROC analyses, Cox regression
Main results	▪ (proximal) recidivism rates increased under consideration of non-registered reoffending on top of officially registered reoffending ▪ valid risk prediction of all instruments according to their intended purposes ▪ greater offense severity and, in particular, greater number of ACEs reduce the predictive accuracy of the J-SOAP II and the VRAG-R

ACEs in JSOs and relate ACEs to the maintenance of general and sexual crime. In particular, the present findings point to the applicability of theories that assume ACEs to generate a steady vulnerability, whose interactions with current stressors result in (repeated) crime perpetration (e.g., Agnew, 1992; Marshall & Barbaree, 1990; Thornton & D'Orazio, 2016; Ward & Beech, 2006).

The present studies further indicate that with regard to the associations of ACEs and sexual crime, the role of the JSOs' own sexual victimization experiences is not clear-cut. Prevalence rates of sexual victimization were rather low in the present sample and most likely coexistent to a range of other ACEs. Equally, associations of sexual victimization with offense characteristics and criminal persistence were versatile. Thus, the current file-based studies point to previous research that has recommended not to take the general role of sexual victimization in sexual offending for granted, but to consider (a) specific features of these experiences, such as age of occurrence or frequency; and (b) coexisting ACEs that may be relevant for the development of sexual crime (e.g., D. L. Burton et al., 2002; Leach et al., 2016; Plummer & Cossins, 2016). The latter is included in models that attribute importance to other ACEs besides sexual victimization in the etiology of sexual violence, such as the TOPA model (e.g., Rasmussen, 2012a). However, embedding present findings in etiological theories of juvenile sexual offending is impeded due to the lack of a control group with juveniles who have not sexually offended. Thus, it is not possible to make clear conclusions about which or how ACEs influence the development of sexually abusive behaviors over general delinquent behaviors, and to evaluate the accuracy of, e.g., the victim-to-victimizer paradigm (e.g., G. Ryan, 1989), social learning theories (e.g., Bandura, 1973), or other etiological models. However, as one of the main goals of the present thesis was to disentangle the heterogeneity within JSO samples rather than contrast JSOs to other, not sexually abusive adolescents, the present findings may still be of major importance for the generation of hypotheses concerning specific pathways to crime in particular JSO-subtypes. This and further limitations of the current studies will be addressed in the subsequent paragraphs.

2. Appraisals of Study Procedures

2.1 Strengths of the present studies

Meeting the oft-cited shortcomings that previous studies have commonly used rather small and/or selective JSO samples (Aebi et al., 2011; Fanniff & Letourneau, 2012; Hempel et al., 2013; Lussier, 2017; Miccio-Fonseca, 2016; Parks & Bard, 2006; Wijetunga et al., 2016; Worling et al., 2012), the present thesis included a large number of JSOs that had not been preselected, e.g., by treatment condition (e.g., Martinez et al., 2015), but represented a

consecutive, court-based sample. Thus, JSOs showed considerable variation with regard to personal and offense characteristics as well as re-offense risk, which was beneficial in order to disentangle this heterogeneity by defining specific JSO-subtypes. The use of state-of-the-art statistical procedures such as LCA and LTA allowed an empirical definition of subtypes, and thus counteracted the potential difficulties associated with theoretically derived, predefined subtyping approaches (e.g., potential overlap of subtype characteristics; Aebi et al., 2012). Furthermore, the heterogeneity of JSOs was respected in the evaluation of the performances of risk assessment instruments by accounting for potential influences of differing offense severity and ACE burden. The inclusion of both officially registered (from two sources containing both juvenile and adult crime data) and non-registered reoffending allowed the approximation toward the dark field of crime (e.g., Maier et al., 2013), and the consideration of different recidivism periods met previous claims to account for the fast developmental changes in potential risk factors during the course of adolescence (e.g., Hempel et al., 2013).

With regard to the inclusion of ACEs, three major strengths deserve emphasis. First, the ACE categories used in the present thesis were based on an instrument that had been developed on a comprehensive theoretical and empirical foundation (see Isele et al., 2014; Teicher & Parigger, 2015). These ACEs not only referred to intra-familial but also to extra-familial experiences such as peer bullying, which has been proven to be a highly prevalent form of adversity among minors (Menesini & Salmivalli, 2017). Second, the coexistence and time-dependent effects of a multitude of ACEs was accounted for as proposed by other researches (e.g., Teicher & Samson, 2016). Third, case files contained several external sources of information. Thus, ACE prevalence was not limited to self-report only as this approach had been criticized by previous research due to questionable validity resulting in biased prevalence estimations (e.g., Hardt & Rutter, 2004; Stoltenborgh et al., 2015).

Finally, the inclusion of non-contact, online sexual harassment in both measures of sexual victimization and perpetration was in line with contemporary research that has reported that Internet-based forms of sexually abusive behaviors are common among adolescents (e.g., Mohler-Kuo et al., 2014). In fact, a specific JSO subtype was identified within the present thesis with elevated rates of verbal/online sexual perpetration (Barra, Mokros, et al., 2017).

2.2 Limitations of the present studies

However, the present empirical studies are not free of qualifications that must be regarded in the interpretation of the findings and the deduction of implications. Study-specific

limitations are described in detail in the accordant sections of Chapter B. Yet, some of these limitations apply to the overall research approach used for the present thesis and are therefore mentioned in the following.

One major limitation that has already been outlined above is the lack of a comparison group of juveniles who have not sexually offended, which impedes the generation of clear etiological assumptions about sexual offending. Even so, despite the fact that only those ACEs were considered that had occurred before a JSO's index offense, the assessment of ACEs remained retrospective, which precludes any causal implications. Second, examined case files had not originally been prepared for the present scientific investigation. Thus, data of interest may not have been deducible to their full extent, which may have led to (a) an underestimation of particular variables; and/or (b) a decrease in generalizability of pertinent findings when subsamples were built due to data availability (i.e., subsamples based on the availability of biographical information). Equally, although self-reports and external sources as well as official and non-registered data were used to assess ACEs and crime data (such as criminal recidivism), respectively, it cannot be excluded that some of these incidents remained unreported (e.g., Hardt & Rutter, 2004; Maier et al., 2013). However, it must be noted that all variables of interest within the current thesis showed significant, highly moderate or substantial interrater agreement, which supports their use in according studies.

Furthermore, due to considerably varying and partially unclear reports in the case files of the present JSO sample with regard to the criteria used to assess psychiatric disorders, the present studies did not account for the potential influences of psychiatric diagnoses on juvenile crime, although poor mental health has been associated with both ACEs and juvenile delinquency (e.g., Bielas et al., 2016). However, as some studies have pointed to the effect of ACEs on delinquency over and above the occurrence of psychiatric disorders (e.g., E. Y. Kim et al., 2016), the findings emerged from the present thesis are still of high relevance.

Two final limitations refer to the sample compositions in the present studies. First, due to the small number of cases, female JSOs were not included in the present analyses. Second, since the sample only contained JSOs living in Switzerland, the generalizability and comparability of the present findings to JSO samples from other countries (i.e., with differing laws) is limited.

3. Implications of the Present Findings

3.1 Implications for research on juvenile sexual offending

The findings of the present thesis underscore that future research needs to address the heterogeneity of JSOs when examining the occurrence, maintenance, and prediction of juve-

nile crime (e.g., Fanniff & Kolko, 2012). JSO-subtypes, at best empirically derived instead of theoretically predefined, should be contrasted to juveniles without sexual offenses in order to evaluate the specific (etiological) impact of certain risk factors on sexual offending.

Research on JSOs should also consider the common experience of ACEs in JSOs and examine their specific, and moreover their shared and combined effects on diverse outcomes. Furthermore, time-dependent effects of ACEs on juvenile sexual offending need further investigation, as some studies have pointed to certain time-specific influences of ACEs on general juvenile delinquency (e.g., Thornberry et al., 2001). In this, parental neglect deserves particular consideration. Not only have findings from the present thesis indicated that neglectful experiences may contribute to the risk of persistent crime in JSOs (Barra, Bessler, et al., 2017c), but there has been an ample debate on the role of parental neglect for both health- and crime-related outcomes, and prior and contemporary researchers have advised to put more emphasis on neglectful ACEs in future studies (Dubowitz, 1994, 2007; R. Gilbert et al., 2009; Infurna et al., 2016; McSherry, 2007; Widom & Maxfield, 2001). Moreover, Thibodeau, Lavoie, Hébert, and Blais (2017) identified a link between neglectful experiences, poor attachment, and sexual risk behaviors in adolescents. Finally, McCuish, Cale, and Corrado (2017) have suggested to consider both the juveniles' and their family member's ACE histories in research on associations between ACEs and sexual offending.

Furthermore, the present thesis underscores that risk assessment instruments should be enhanced to achieve more accurate predictions of reoffending in JSOs (Barra, Bessler, et al., 2017b). For instance, the role of ACEs should gain increased scientific consideration in criminal risk assessment. In the field of general juvenile offending, Fox et al. (2015) have recently stated that a cumulative ACE score appeared to be useful to identify future severe and persistent delinquents. Moreover, recidivism rates were found to differ among specific offense-related JSO-subtypes in the present thesis (Barra, Mokros, et al., 2017). For instance, JSOs with severe offenses (that involved penetration) against peers and/or adults reflected a high-risk subtype that showed increased rates of criminal recidivism, was highly burdened with cumulative ACEs, and most likely showed previous behavioral problems as well as prior involvement in violent (nonsexual) delinquency. Thus, the differing prevalence of several risk factors for persistent crime emphasizes that the applicability of risk assessment instruments in different offense-related JSO-subtypes requires additional scientific consideration. Irrespective of the present findings, risk assessment may further benefit from putting more emphasis on the involvement of protective factors (e.g., Tharp et al., 2013; Worling & Langton, 2015). Equally, more research is needed with regard to physiological approaches to assess recidi-

vism risk in JSOs. For instance, Murphy et al. (2016) have stated that measures of visual preference have been discussed as a promising alternative to other, highly criticized physiological procedures including polygraphy (e.g., Ward, Levenson, & Chaffin, 2011) or penile plethysmography (e.g., Worling, 2012).

Finally, in addition to the JSO-subtypes derived in the present thesis, further specific subgroups of JSOs deserve more scientific attention. First, more research is required that examines the characteristics of female JSOs (E. P. Ryan, 2016). The few studies that have included female JSOs have indicated that they differ from male JSOs in certain features, and thus necessitate specific research consideration (Fox & DeLisi, 2017; Oliver & Holmes, 2015). Second, JSOs with early onsets of sexually abusive behaviors (e.g., before the age of 12 years) represent another specific subgroup. In one of the present analyses (Barra, Bessler, et al., 2017b), male JSOs younger than 12 years were found to show increased proportions of severe offenses such as oral, vaginal, or anal penetration compared to older male JSOs. Because this age-group has been considered a special, yet understudied, population (Rasmussen, 2005), further research should focus on factors that entail sexually coercive behavior in such early stages.

3.2 Implications for judicial and clinical work with JSOs

The present findings underscore that the assessment of a JSO's background (including ACEs) and current social embedment should become a standard procedure in clinical but also in judicial settings (Creeden, 2013). Bearing in mind the high prevalence of ACEs among JSOs, their associations with offense characteristics as well as with criminal persistence, and their impeding effect on risk prediction, it appears crucial to implement ACE screenings as soon as the JSO is assigned to judicial proceedings. Such screenings would deliver preliminary hints about a JSO's ACE burden, leading to the implementation of further, more comprehensive risk assessments, where necessary, which again would derive information on the type of judicial measure best suited to prevent reoffending by meeting the JSO's individual needs. Indeed, there is a short version of the MACE scale that would be suitable in this context (Teicher & Parigger, 2015).

In fact, the identification of a JSO's individual needs is of major importance to assign him/her to effective treatment conditions (Murphy et al., 2016; Rasmussen, 2013; E. P. Ryan, 2016). Taking into account the heterogeneity of JSOs, Murphy et al. (2016) highlight the benefit of applying the risk-need-responsivity (RNR) approach (Andrews & Bonta, 2010) to JSOs, which states that in order to reduce risk of criminal recidivism, effective treatment must (a) be matched in intensity to the individual's specific recidivism risk (risk); (b) target

the individual's specific risk factors (e.g., ACE burden) (needs); and (c) apply specific approaches tailored to the individual's criminogenic and personal features (responsivity). As the findings of the present thesis indicate, risk (and need) assessment should not only rely on risk assessment instruments but consider an individual's personal and family history as well as current social embedment in terms of a comprehensive structured professional judgment (SPJ) approach.

According to Murphy et al. (2016), the most promising approaches to reduce recidivism risk in JSOs are cognitive-behavioral interventions that focus on both risk and protective factors, and consider a JSO's social (e.g., familial) environment. However, Dopp et al. (2016) have only stated weak empirical evidence for the efficacy of cognitive-behavioral interventions in general despite their frequent application with JSOs. They stressed that common cognitive-behavioral interventions may fail to meet the individual treatment needs of JSOs, not least because many of these approaches have been derived from interventions originally designed for adult offenders that neglect the multifaceted nature of individual and social risk factors relevant in juvenile delinquency (Dopp et al., 2016). Multisystemic Therapy (MST; e.g., Borduin et al., 2009), on the other hand, has been considered as an effective, empirically well supported treatment approach for JSOs (Chaffin, 2008; Dopp et al., 2016; Schmucker & Loesel, 2015)[7]. Based on Bronfenbrenner's (1979) theory that describes how different socioecological systems influence each other, MST largely focuses on the comprehensive social environment an individual juvenile is living in. In the direct family context, for instance, functional parenting is taught, e.g., in terms of enhanced supervision. As found in the present thesis, (enduring) lack of supervision may contribute to continuous crime engagement in JSOs (Barra, Bessler, et al., 2017c). Thus, functional parenting may be one promising factor to target in order to decrease risk of criminal recidivism that is covered by MST (e.g., Dopp et al., 2016).

The high prevalence of ACEs among JSOs further indicates the potential benefit of implementing trauma informed care (TIC) in the treatment of JSOs (Levenson, 2014). According to Levenson (2014), TIC describes a therapeutic perspective which recognizes that specific thoughts or behaviors of a person may be strongly influenced by previous adverse experiences. This perspective is incorporated within the therapeutic process. Levenson (2014) further stated that TIC could be used in combination with any other treatment approach such

[7]However, more precisely, the developers of MST for JSOs themselves consider their treatment approach as „probably efficacious" (p. 5) because of the lack of evaluation studies conducted by independent researchers (Dopp et al., 2016).

as RNR-based or cognitive-behavioral interventions. Yet, Rasmussen (2013) has noted that TIC is rarely implemented with JSOs.

As ACEs were found to be associated with increased recidivism risk/rates in the present thesis (Barra, Bessler, et al., 2017b, 2017c; Barra, Mokros, et al., 2017), it appears beneficial to apply specific trauma-oriented interventions to JSOs to reduce the risk of chronic crime engagement. Narrative exposure therapy for forensic offender rehabilitation (FORNET; Elbert et al., 2012) may be one budding approach, although not yet evaluated for the use in sexually abusive juveniles. However, there is a version of narrative exposure therapy for children and adolescents (KIDNET; e.g., Schauer, Neuner, & Elbert, 2017). Combining these two NET forms to generate a treatment approach for forensic (sexually abusive) adolescents could be promising. Ford et al. (2016) reviewed some current interventions that focus specifically on juvenile delinquents with ACE (trauma) histories, highlighting their effectiveness but also their shortcomings. One of these approaches is Trauma Adaptive Recovery Group Education and Therapy (TARGET; e.g., Ford, 2015) which is, however, not yet evaluated concerning its use in JSOs. As a framework for treating JSOs, Rasmussen (2012a) suggests the usability of the abovementioned TOPA model (see Chapter A), although its effectiveness is not yet empirically proven.

Finally, the present thesis also accentuates that not all JSOs are highly burdened with ACEs and show elevated re-offense risk, but that there are a considerable number of JSOs with rather unproblematic developmental histories and low probabilities of criminal recidivism (e.g., those of the touch-offender and verbal/online-offender subtypes; Barra, Mokros, et al., 2017). According to the RNR approach (Andrews & Bonta, 2010), these juveniles may benefit, e.g., from (community-based) intervention and prevention approaches with rather low intensity that broach (a) the issue of situational risk factors associated with sexual offending, such as social (group) pressure (Bijleveld & Hendriks, 2003); and (b) the issue of sexual offending on the Internet (Mohler-Kuo et al., 2014).

3.3 Implications for policy actions to counteract juvenile sexual offending

As stated above (see Chapter A), sexual violence has been considered as a public health issue; as such, policymakers and stakeholders should promote prevention approaches that reduce the prevalence of sexually abusive behaviors (e.g., Letourneau et al., 2014). Considering the findings of the present thesis, prevention may be particularly successful when focusing on ACE victimization, both in intra- and extra-familial contexts. In his description of primary, secondary, and tertiary prevention approaches to reduce the occurrence of sexual violence, Basile (2003), for instance, emphasizes to broaden the issue of intra-familial ACEs

(e.g., by promoting parenting training to counteract maltreatment). With regard to extra-familial ACEs, Bradshaw (2015) summarized the current empirical knowledge on the effectiveness of preventive measures against peer bullying (e.g., school-based programs).

Whereas the reduction of ACEs appears to be a major factor in decreasing the risk of juveniles to engage in sexual offending, prevention does also include the treatment of juveniles that have already sexually offended (tertiary prevention; e.g., Basile, 2003). Thus, policymakers and stakeholders are also in demand of promoting the development of effective treatment approaches. At this point, it is worth noticing that the studies of the current thesis could not have been conducted without the support of the Swiss Federal Office of Justice and the Juvenile Prosecution Office of the Canton Zurich, who commissioned and funded the present framework project on the evaluation of a specific treatment program for JSOs in Switzerland. This is one highly appreciated example of how policymakers and stakeholders may support important research and contribute to increasing progress with regard to the scientific knowledge about juvenile sexual offending. Although the financial support of such projects by public funds may not be much appreciated by the general society due to prejudice and stigmatization toward JSOs (Chaffin, 2008), efforts may result in a manifold pay-off: Effective treatment may not only support the functional development of JSOs and prevent the society from further crime victimization, but may also result in a considerable amount of public savings on the long run (e.g., Borduin & Dopp, 2015).

4. General Conclusions

The present thesis built on the notion that the emergence of sexuality is a topic of major importance in the normative course of adolescence but becomes alarming when sexual behaviors include any forms of violence or coercion. Based on a large, court-based sample of JSOs, four studies were conducted within the present thesis that aimed at disentangling the heterogeneity of JSOs in order to gain a sophisticated understanding of the occurrence, maintenance, and prediction of their criminal patterns. Particular emphasis was given to the role of ACEs in the present analyses because multiple etiological models have highlighted their influences on sexual and nonsexual violence. In short, the present thesis found that (a) JSOs were highly burdened with multiple ACEs; (b) distinct ACE patterns were differentially related to offense characteristics; (c) ACEs exerted time-dependent effects on criminal recidivism; (d) JSOs with rather severe offenses showed higher rates of ACEs and increased risk of criminal recidivism; (e) risk assessment instruments for JSOs predicted criminal recidivism well according to their intended purposes; and (f) elevated offense severity and in-

creased ACE rates impeded the predictive accuracy of two of the three risk assessment instruments considered in the present thesis.

The present results underscore the need to consider the heterogeneity of JSOs in research, judicial, and clinical settings as well as adapt according policies. Aiming at decreasing the prevalence of juvenile sexual offending, professionals should assess a multitude of intra- and extra-familial ACEs in JSOs, implement interventions that meet the individual needs of a JSO (such as approaches that focus on the reduction of recent/current adversities [e.g., MST; Borduin et al., 2009] or on the processing of past ACEs [e.g., TARGET; e.g., Ford, 2015]), consider the JSO's ACE and offense history in the assessment of re-offense risk, and promote and offer education and prevention programs that reduce the occurrence of ACEs and other potentially negative influences in the first place.

Finally, political questions and decisions in the context of (juvenile) sexual delinquency should consider contemporary research results. For instance, regarding the current debate in Switzerland about lifelong bans from working with children, adolescents, and other dependent individuals for persons who have sexually offended against this target group (see Chapter A, paragraph 1.4), our findings support the exclusion of JSOs from this ban because rates of sexual recidivism were relatively low and JSOs with child victims were not found to be at particular risk of reoffending against children (which also highlights the inappropriateness of generally labeling them as pedophilic; Barra, Mokros, et al., 2017). Policymakers and stakeholders should also support the communication of contemporary research results toward to general population. This may contribute to the reduction of stigmatization and prejudice toward JSOs, which are both highly inadequate given the wide heterogeneity among these juveniles that rather calls for the comprehensive and individual consideration of each JSO's personal path toward delinquency (e.g., Chaffin, 2008).

May the findings of the present thesis inspire the prospective work of policymakers, stakeholders, judicial, research, and clinical professionals in the field of juvenile sexual offending, and contribute to the development of effective measures to prevent the society from future crime victimization, reduce prejudice and stigmatization toward JSOs, and give adolescents a positive outlook on a secure, non-delinquent, and care-free future.

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I dedicate this dissertation to you.

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Education

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University of Zurich, Department of Psychology
Thesis: On the heterogeneity of juveniles who have sexually offended: The role of adverse childhood experiences in the occurrence, maintenance, and prediction of crime
Supervisors: Prof. Dr. Markus Landolt, Prof. Dr. Susanne Walitza, Prof. Dr. Elmar Habermeyer, PD Dr. Marcel Aebi
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Oct 13 – Sept 14 **Master of Science (with distinction), Psychology**
University of Konstanz, Department of Psychology
Thesis: Popularity by any means? Longitudinal associations between adolescent bullying and social standing, and their relations to classroom morality
Supervisors: Prof. Dr. Sonja Perren, Dr. Fabio Sticca, Dr. Jan Pfetsch

Oct 09 – Sept 13 **Bachelor of Science (with distinction), Psychology**
University of Konstanz, Department of Psychology
Thesis: On the assessment of early life stress: A comparison of two retrospective instruments
Supervisors: Prof. Dr. Brigitte Rockstroh, Dr. Astrid Steffen

Jun 08 **Abitur** (German diploma qualifying for university admission)
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Research and Clinical Experience

Oct 14 - present **Research Assistant**
University Hospital of Psychiatry Zurich, Department of Forensic Psychiatry, Center for Child and Adolescent Forensic Psychiatry and Psychotherapy
- evaluation of a specialized treatment for sexually abusive juveniles (RCT)
- examination of risk factors for juvenile delinquency with focus on early life stress
- clinical and forensic assessment with sexually abusive juveniles

Apr 13 - Sept 14 **Research Assistant**
Psychiatric University Clinics Basel, Department of Child and Adolescent Psychiatry
- research focusing on early life stress, aggression, empathy, emotion regulation, and conduct disorders of children and adolescents (e.g., EMG, GSR)
- development of the German Guidelines for Child and Adolescent Aggression & Conduct Disorder
- evaluation of Multisystemic Therapy (MST) and Multisystemic Therapy Child Abuse and Neglect (MST-CAN) in Switzerland
- clinical work with aggressive children and adolescents

May 12 - Mar 13 **Research Assistant**
University of Konstanz, Department of Psychology, Group of Clinical Psychology and Clinical Neuropsychology
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Sept 11 – Apr 12 **Intern**
Charité Universitätsmedizin Berlin, Department of Child and Adolescent Psychiatry, Psychosomatic Medicine and Psychotherapy
- research focusing on eating disorders and somatoform disorders
- projective, disorder-related and intelligence assessment
- volunteering in individual and group therapy sessions

Aug 10 – Aug 11 **Research Assistant**
University of Konstanz, Department of Empirical Educational Research
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Teaching Experience

Mar 17 – Jun 17 **Supervisor Bachelor Thesis**
University of Zurich, Department of Psychology
Thesis: Risk assessment in juveniles who have sexually offended: Strengths and limitations of current practice in the prediction of recidivism

Jan 16 – Dec 16 **Supervisor Master Thesis**
University of Zurich, Department of Psychology
Thesis: Juvenile sexual delinquency and the role of adverse childhood experiences: A comparison of individual and group offenders in Switzerland

Publications

2017 Aebi, M., Mohler-Kuo, M., Barra, S., Schnyder, U., Maier, T., & Landolt, M. A. (2017). Posttraumatic stress and youth violence perpetration: A population-based cross-sectional study. *European Psychiatry, 40*, 88-95. https://doi.org/10.1016/j.eurpsy.2016.08.007

Barra, S., Bessler, C., Landolt, M. A., & Aebi, M. (2017). Patterns of adverse childhood experiences in juveniles who sexually offended. *Sexual Abuse: A Journal of Research and Treatment*. Advance online publication. https://doi.org/10.1177/1079063217697135

Barra, S., Bessler, C., Landolt, M. A., & Aebi, M. (2017). Type and timing of maltreatment influence criminal persistence in sexually abusive adolescents. *Law and Human Behavior*. Advance online publication. https://doi.org/10.1037/lhb0000255

2016 Aebi, M., Barra, S., Bessler, C., Steinhausen, H.-C., Walitza, S., & Plattner, B. (2016). Oppositional defiant disorder dimensions and subtypes among detained male adolescent offenders. *Journal of Child Psychology and Psychiatry, 57*(6), 729-736. https://doi.org/10.1111/jcpp.12473

Bielas, H., Barra, S., Skrivanek, C., Aebi, M., Steinhausen, H.-C., Bessler, C., & Plattner, B. (2016). The associations of cumulative adverse childhood experiences and irritability with mental disorders in detained male adolescent offenders. *Child and Adolescent Psychiatry and Mental Health, 10*(1), 34. https://doi.org/10.1186/s13034-016-0122-7

submitted Barra, S., Bessler, C., Landolt, M. A., & Aebi, M. (2017). *Testing the validity of criminal risk assessment tools in sexually abusive youth.*

Barra, S., Bessler, C., Landolt, M. A. & Aebi, M. (2017). *Belastende Kindheitserfahrungen von Jugendlichen mit Sexualdelikten: Zusammenhänge mit Tatcharakteristika und Rückfälligkeit [Adverse childhood experiences in juveniles who have sexually offended: Associations with offense characteristics and criminal recidivism]*.

Barra, S., Mokros, A., Landolt, M. A., Bessler, C., & Aebi, M. (2017). *Criminal persistence and psychosocial adversity in empirically derived offense-related subtypes of sexually abusive adolescents.*

Barra, S., Sticca, F., Perren, S. (2017) *Popularity by any means? Longitudinal dynamics of bullying, peer victimization, and social standing in adolescence.*

Manetsch, M., Aebi, M., Barra, S., Goth, K., Schmeck, K., Bessler, C., & Plattner, B. (2017). *Temperament profiles/dimensions and their associations with psychopathology and criminal behaviours in male adolescents.*

Conference Contributions

2017

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2017, July). Maltreatment and criminal persistence in sexually abusive adolescents: Type and timing matter. In M. Aebi & L. Goldbeck (Chairs), *Outcomes of childhood experiences of abuse and neglect in adolescence and young adulthood*. Symposium conducted at the 17th International Congress of the European Society of Child and Adolescent Psychiatry (ESCAP), Geneva, Switzerland.

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2017, May). *Belastende Kindheitserfahrungen von Jugendlichen mit Sexualdelikten: Art und Zeitpunkt prädizieren kriminelle Rückfälligkeit [Adverse childhood experiences of juveniles who have sexually offended: Type and timing predict criminal recidivism]*. Poster session presented at the annual congress for Master and PhD students ("MaDoKo") of the Department of Psychology of the University of Zurich, Zurich, Switzerland.

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2017, March). BelastendeKindheitserfahrungen von Jugendlichen mit Sexualdelikten: Zusammenhänge mit Tatcharakteristika und Rückfälligkeit [Adverse childhood experiences in juveniles who have sexually offended: Associations with offense characteristics and criminal recidivism]. In F. Häßler & O. Reis (Chairs), *Forensik*. Symposium conducted at the XXXV. Kongress der Deutschen Gesellschaft für Kinder- und Jugendpsychiatrie, Psychosomatik und Psychotherapie (DGKJP), Ulm, Germany.

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2017, February). *Muster von belastenden Kindheitserfahrungen bei Jugendlichen mit Sexualdelikten und deren Zusammenhänge mit Tatmerkmalen und krimineller Rückfälligkeit [Patterns of adverse childhood experiences in juveniles who have sexually offended and their relations to offense characteristics and criminal recidivism*]. Poster session presented at the 19th Jahrestagung der Deutschsprachigen Gesellschaft für Psycho-traumatologie / 22nd Zürcher Psychotraumatologie-Tagung, Zurich, Switzerland.

2016

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2016, November). *Belastende Kindheitserfahrungen von Jugendlichen mit Sexualdelikten: Zusammenhänge mit Tatcharakteristika und Rückfälligkeit [Adverse childhood experiences in juveniles who have sexually offended: Associations with offense characteristics and criminal recidivism]*. Paper presented at the 6th Symposium für Empirische Forschung in der forensischen Psychiatrie, Psychologie und Psychotherapie (EFPPP), Mainz, Germany.

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2016, October). *Patterns of adverse childhood experiences in juveniles who have sexually offended and their relations to offense characteristics and criminal recidivism*. Paper presented at the 3rd Burghölzli Psychiatry Meeting, Zurich, Switzerland.

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2016, September). Patterns of adverse childhood experiences in juveniles who sexually offended and their relations to offense characteristics. In M. Aebi & C. Bessler (Chairs), *Juveniles who sexually offended: Subtypes and offense characteristics*. Symposium conducted at the Conference of the International Association for the Treatment of Sexual Offenders (IATSO), Copenhagen, Denmark.

Barra S., Bessler, C., Landolt M. A., & Aebi, M. (2016, May). Patterns of adverse childhood experiences in juveniles who sexually offended and their relations to offense characteristics. In M. Aebi & C. Bessler (Chairs), *Juveniles who sexually offended: Subtypes and offense characteristics*. Symposium conducted at the 5th biennial congress of the European Association for Forensic Child and Adolescent Psychiatry, Psychology and other involved Professions (EFCAP), Porto, Portugal.

2015 Barra S., Sticca F., & Perren, S. (2015, September). Populär um jeden Preis? Längsschnittliche Zusammenhänge zwischen Mobbing, Viktimisierung und sozialem Status im Klassenverband [Popularity by any means? Longitudinal associations between adolescent bullying and social status in school]. In F. Sticca (Chair), *Applications of advanced latent longitudinal modeling techniques in educational research*. Symposium conducted at the 12th Tagung der Fachgruppe Methoden & Evaluation [FGME 2015] der Deutschen Gesellschaft für Psychologie, Jena, Germany.

Aebi, M., Barra, S., Bessler, C., Steinhausen, H.-C., Walitza, S., & Plattner, B. (2015, November). *Subtypen der Störung mit oppositionellem Trotzverhalten bei männlichen jugendlichen Gefängnisinsassen [Oppositional defiant disorder subtypes among detained male adolescent offenders]*. Poster session presented at the Kongress der Deutschen Gesellschaft für Psychiatrie und Psychotherapie, Psychosomatik und Nervenheilkunde (DGPPN), Berlin, Germany.

Invited Presentations

2016 Guest speaker at course of lectures concerning chronic truancy and adolescent violence, hosted by the city of Konstanz, Service of Criminal Prevention (90min)

Awards

May 17 Poster award at the congress for Master and PhD students ("MaDoKo") of the Department of Psychology of the University of Zurich; Poster title: *Belastende Kindheitserfahrungen von Jugendlichen mit Sexualdelikten: Art und Zeitpunkt prädizieren kriminelle Rückfälligkeit [Adverse childhood experiences of juveniles who have sexually offended: Type and timing predict criminal recidivism]*.

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Erklärung

Hiermit erkläre ich, dass die Dissertation von mir selbst ohne unerlaubte Beihilfe verfasst worden ist und diese Dissertation noch an keiner anderen Fakultät eingereicht wurde.

Ort und Datum Unterschrift

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